TM 9-1245

WAR DEPARTMENT

TECHNICAL MANUAL

*

37-MM GUN, M3, AND CARRIAGE, M 4

TECHNICAL MANUAL

37-MM GUN, M3, AND CARRIAGE, M4

CHANGES No. 1

WAR DEPARTMENT,
WASHINGTON, September 10, 1942.

TM 9–1245, January 15, 1941, is changed as follows:

10. Gun.

* * * * * * *

b. The accuracy life * * * to 1 gallon of water. The chamber and bore should then be wiped perfectly dry and oiled with a light **coat of oil, engine, as indicated in the lubrication guide for this gun.**

c. The breech mechanism should be disassembled and all parts pertaining to the firing mechanism thoroughly cleaned and before reassembling coated with a light **film of oil, engine, or oil, lubricating, for aircraft instruments and machine guns. The latter should always be used in temperatures below 10° F.**

[A. G. 062.11 (8–13–42).] (C 1, Sept. 10, 1942.)

11. Carriage.

* * * * * * *

***d.* Following is the lubrication guide for this matériel:**

[A. G. 062.11 (8–13–42).] (C 1, Sept. 10, 1942.)

12. To fill recoil mechanism and establish void.

* * * * * * *

b. Fill the oil gun (B156647) (an accessory) **with oil, recoil, heavy** from a supply can, care being taken * * * into the recoil cylinder rear plug hole.

c. Remove the recoil cylinder head plug * * * out of the recoil cylinder head plug hole. **The capacity of the recoil mechanism is 5 pints.**

[A. G. 062.11 (8–13–42).] (C 1, Sept. 10, 1942.)

29. Assembly of wheels to axle.

* * * * * * *

***a.* Remove the bearings from the hub and wash them in solvent, dry-cleaning, until all the old grease is removed.**

***b.* Lay them aside to dry and wash the inside of the hub and the spindle with solvent, dry-cleaning.**

***c.* When bearings are thoroughly dry, pack the races with grease, general purpose, No. 2, and reassemble in hub. Do not apply any grease to the inside of the hub or on the spindle.**

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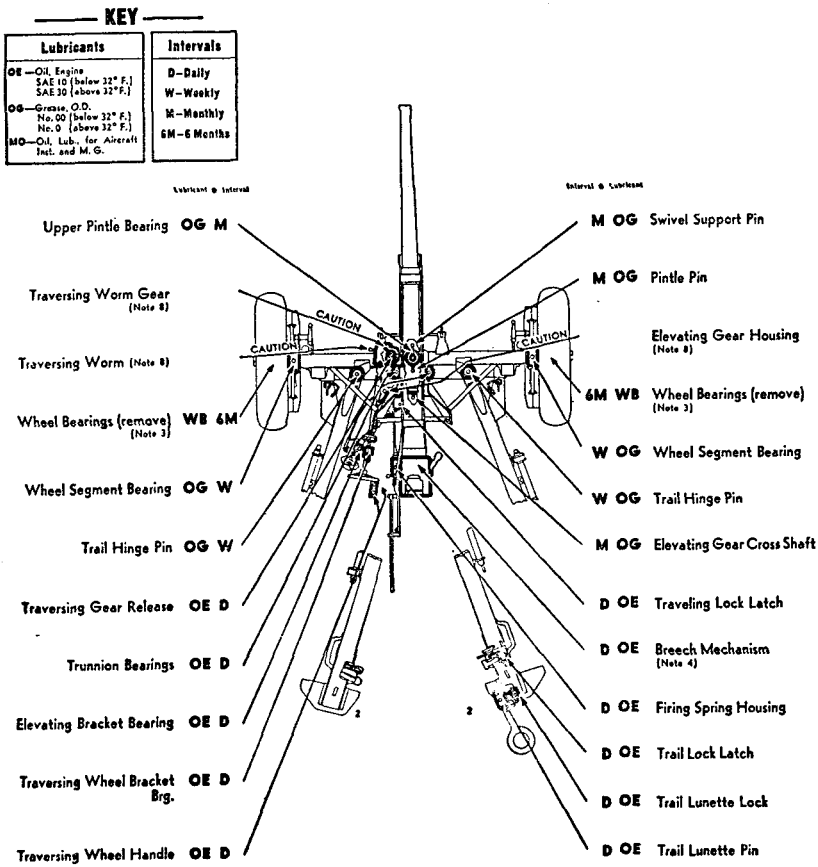
CARRIAGE, GUN, 37 mm, M4 (A.T.)
GUN, 37 mm, M3 (A.T.)


KEY
Lubricants
OE—Oil, Engine SAE 10 (below 32° F.) SAE 30 (above 32° F.)
OG—Grease, G.D. No. 00 (below 32° F.) No. 0 (above 32° F.)
MO—Oil, Lub., for Aircraft Ind. and M.G.
Intervals
D—Daily
W—Weekly
M—Monthly
6M—6 Months
Lubricant & Interval
Interval & Lubricant
Upper Pintle Bearing OG M
Traversing Worm Gear (Note 8)
Traversing Worm (Note 8)
Wheel Bearings (remove) (Note 3) WB 6M
Wheel Segment Bearing OG W
Trail Hinge Pin OG W
Traversing Gear Release OE D
Trunnion Bearings OE D
Elevating Bracket Bearing OE D
Traversing Wheel Bracket Brg. OE D
Traversing Wheel Handle OE D
M OG Swivel Support Pin
M OG Pintle Pin
Elevating Gear Housing (Note 8)
6M WB Wheel Bearings (remove) (Note 3)
W OG Wheel Segment Bearing
W OG Trail Hinge Pin
M OG Elevating Gear Cross Shaft
D OE Traveling Lock Latch
D OE Breech Mechanism (Note 4)
D OE Firing Spring Housing
D OE Trail Lock Latch
D OE Trail Lunette Lock
D OE Trail Lunette Pin
CAUTION
CAUTION
CAUTION
CHEK-CHART NO. 2

Lubrication guide.

LUBRICATION INSTRUCTIONS FOR CARRIAGE, GUN, 37 mm, M4 (A. T.) GUN, 37 mm, M3 (A. T.)

NOTES Additional Lubrication and Service Instructions on Individual Units and Parts NOTES

1. INTERVALS indicated are for normal service. For extreme conditions of speed, heat, water, mud, snow, rough roads, dust, etc., lubricate more frequently.

2. FITTINGS — Clean before applying lubricant. CAUTION: Always lubricate after washing gun and carriage.

3. WHEEL BEARINGS—Remove wheel, clean and repack bearings.

4. BREECH AND FIRING MECHANISM —Disassemble, clean and oil all moving parts immediately before and after firing, and daily at all other times. To avoid misfiring below freezing, remove firing mechanism, dip in *SOLVENT, dry-cleaning,* operate firing pin in solvent, dry and lubricate with MO.

5. RECOIL SLIDES—Remove locking key located below breech, retract gun and apply OG to slides.

6. GUN BORE — Clean and coat bore with OE after firing. Inspect daily and oil if needed.

7. OIL CAN POINTS—Lubricate traversing mechanism universal joints, trail lock mechanism, clevises, hinges, and trigger mechanism with OE daily.

8. POINTS TO BE LUBRICATED BY ORDNANCE MAINTENANCE PERSONNEL AT TIME OF ORDNANCE INSPECTION—Elevating and Traversing Gear Mechanism.

The grease in the bearing races is sufficient to provide lubrication until the next service period. An excess may result in leakage of the lubricant into the brake drum.

d. **Mount the wheel on the spindle and tighten the nut on the end of the spindle until there is a slight drag when the wheel is rotated.**

e. **Back off the nut until the wheel turns freely (one-half turn is usually sufficient) and insert cotter pin.**

f. **Install hub cap. The cap must be free of grease.**

[A. G. 062.11 (8–13–42).] (C 1, Sept. 10, 1942.)

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

OFFICIAL:
J. A. ULIO,
Major General,
The Adjutant General.

U. S GOVERNMENT PRINTING OFFICE: 1942

TECHNICAL MANUAL
No. 9–1245

WAR DEPARTMENT,
WASHINGTON, *January 15, 1941.*

37-MM GUN, M3, AND CARRIAGE, M4

Prepared under direction of the Chief of Ordnance

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SECTION I

GENERAL

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1. Purpose.—The purpose of this manual is to furnish instructions for the maintenance and shop repair of the 37-mm gun, M3, and 37-mm gun carriage, M4. This manual is for use of ordnance maintenance companies, civilian employees of the Ordnance Department, Reserve Officers' Training Corps students, and National Guard and Reserve officers charged with the maintenance and repair of this matériel.

2. Scope.—The manual contains instructions for inspection, disassembly and assembly, and maintenance and repair. It also describes and prescribes the use of special repair tools.

3. References.—The appendix gives references to pertinent publications applicable to this matériel.

SECTION II

INSTRUCTIONS FOR INSPECTION

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Inspection of carriage	6
Check of matériel with Field Service Modification Work Orders	7

4. General.—*a.* Inspection is for the purpose of determining the condition of the matériel, whether repairs or adjustments are required, and the remedies necessary to insure that the matériel is in such serviceable condition that it will function properly.

b. In the Artillery Gun Book, OO Form 5825, may be found an outline of its use. See also OFSB 4-1.

(1) The estimated average accuracy life in full service rounds of the 37-mm gun, M3, is 15,000 rounds. The guns in service should be star gaged at approximately 10 percent and 90 percent of their estimated average accuracy life in rounds fired, and thereafter at 10 percent during the remainder of their service. Also, they should be star gaged at any time an inspector may deem it necessary on account of doubtful conditions, or when the bore shows signs of unusual wear or other irregularities. Decoppering of the bore of cannon before star gaging is prohibited. When star gaging the 37-mm gun, M3, the greatest

distance from the muzzle at which star gage measurements are to be made is 68.45 inches.

(2) For pastilles, or other defects of the bore of the gun which require plaster of paris or gutta-percha impressions for measurement purposes, plaster of paris should be used if practicable, as it gives a harder surface than gutta-percha and a more accurate measurement is obtained.

5. Inspection of gun.—The following instructions with reference to the inspection of the gun, recoil mechanism, and carriage should be scrupulously observed. Defects in the bore of the weapon should be written in the gun book. For dissassembly and assembly of matériel, see Section IV.

Parts to be inspected in order of inspection	Points to be observed
a. Gun as a unit	*a.* Note general appearance; smoothness of operation of breech mechanism in opening and closing. Test action of firing mechanism with firing plunger (A168126, fig. 10) and by firing mechanism lever handle (A169346, fig. 9). Disassemble breech mechanism and thoroughly clean it and tube. Note condition of bore for ragged lands; for erosion at origin of rifling. Examine breech recess for scored surfaces.
b. Breech mechanism	*b.* Examine breechblock for scored or dented surfaces. Note condition of firing pin, firing spring, sear, firing pin guide, cocking lever, cocking lever plunger, spring, and firing spring retainer.
c. Extractor	*c.* Examine for broken lips.
d. Catch	*d.* Examine catch for broken or bruised lip.
e. Operating handle	*e.* Examine slot in handle portion for burrs and sharp cutting edges. See that operating handle latch (B8437, fig. 5), moves freely and that the operating handle latch spring (A25207) performs its function properly.

6. Inspection of carriage.

Parts to be inspected in order of inspection	Points to be observed
a. Carriage as a unit	*a.* Note general appearance, whether carriage is painted in accordance with regulations, and that all moving parts are properly lubricated.

Parts to be inspected in order of inspection	Points to be observed
b. Recoil mechanism	*b.* Test to see that mechanism has required amount of oil. Examine the following places for oil leakage: Around recoil cylinder head (B156653, fig. 7), and around piston packing housing follower (B153761).
c. Elevating mechanism	*c.* Elevate and depress gun through full extent of its travel. Note whether mechanism operates without binding or undue backlash.
d. Traversing release mechanism.	*d.* Pull traversing mechanism lever rod handle (B154191, fig. 12), to the rear. Note whether the mechanism releases the traversing mechanism clutch (B154049, fig. 13), and the top carriage moves freely.
e. Traversing mechanism	*e.* Traverse carriage throughout its movement. Note whether mechanism operates without binding or undue backlash.
f. Shield, traveling lock, and wheel segments.	*f.* Examine all locking devices and note that they perform their proper functions.
g. Wheel and automobile tires.	*g.* Examine disk and rim wheel. Note if it is distorted. Note condition of tread of automobile balloon tire and note whether it is taking road wear.

7. Check of matériel with Field Service Modification Work Orders.—Before release of matériel to the using arm, it should be checked against existing Field Service Modification Work Orders and modified accordingly.

SECTION III

TOOLS FOR INSPECTION

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8. General.—The tools for inspection and those pertaining to maintenance and repair are issued as a set of special repair tools.

9. Tools for inspection.—The following tools are used in the inspection of the gun and carriage.

a. Sights, bore.—These sights consist of breech and muzzle bore sights which are used in the verification and adjustment of the telescope and telescope mount.

b. Target, testing.—This target is used in conjunction with the bore sights in verification and adjustment of the telescope and telescope mount.

c. Gage, pressure, tire.—This gage is used in testing the air pressure in the tires of the carriage.

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10. Gun.—*a.* Cannon become less copper fouled when properly cared for. The wear of the cannon does not depend entirely upon the number of rounds fired but rather upon the care given the bore in cleaning, greasing, and allowing of sufficient time for cooling between rounds.

b. The accuracy life of cannon usually depends upon the fast rate of fire and its attendant excessive heating; therefore, after firing it is essential that the bore and chamber be cleaned to remove the residue of powder and then thoroughly oiled. In cleaning, use the sponge and wash the bore with a solution of soda ash and water or sal soda and water in the proportion of ½ pound of soda ash, or 1 pound of sal soda, to 1 gallon of water. The chamber and bore should then be wiped perfectly dry and oiled with a light coat of lubricating oil.

c. The breech mechanism should be disassembled and all parts pertaining to the firing mechanism thoroughly cleaned and before reassembling coated with a light coat of lubricating oil.

11. Carriage.—*a.* Maintenance of the carriage in service requires proper cleaning, strict observance of the lubrication program, and proper attention to the recoil mechanism, traveling locks, and clamping device of the trails.

b. All bearing surfaces, screw threads, and exterior parts must be clean and free from dirt. Special attention should be given those bearing surfaces which are exposed. When placing the carriage in firing or traveling position, or when assembling operations are being carried on, extra precautions must be taken to prevent the entrance of foreign matter into the working parts.

c. Disassembling and assembling operations as outlined in paragraphs 12 to 44 are given as a guide for the repair and replacement of damaged parts.

12. To fill recoil mechanism and establish void.—*a.* Depress the cradle 1° or 2°. Remove the recoil cylinder rear plug (A168097, fig. 7).

b. Fill the oil gun (B156647) (an accessory) from a supply can, care being taken to have the nozzle of the oil gun well under the surface of the oil supply to avoid drawing air into the oil gun. Screw the oil gun into the recoil cylinder rear plug hole.

c. Remove the recoil cylinder head plug (A168704, fig. 7). Force oil by means of the oil gun into the cylinder until the oil flows out of the recoil cylinder head plug hole.

d. Elevate the gun to 15° and continue to force oil slowly through the cylinder and out of the recoil cylinder head plug hole to eliminate

all trapped air in the recoil cylinder. When air bubbles cease to emerge with the oil replace the recoil cylinder head plug.

e. Depress the gun to its original position of 1° or 2° depression, and remove the oil gun and assemble the recoil cylinder rear plug.

13. Disassembly or firing mechanism from breechblock.—*a.* With the chamber empty, close the breech and pull the trigger (B8446, fig. 5). Press the firing spring retainer (B8444) in against the firing spring (A25204) and rotate the firing spring retainer one-quarter turn to remove the pressure. The firing spring will force the firing spring retainer out. The firing spring (A25204) firing pin, and allied parts may then be ejected by throwing the firing pin cocking lever (B8443) forward.

b. To remove breechblock and operating mechanism.—(1) Remove the operating handle detent (A25213, fig. 5) by springing its knurled end out of its seat in the outer side of the left hand breech ring lug and rotate the detent in a clockwise direction until the knurled end passes off the surface of the lug. Grasp the knurled end by the fingers and pull out the detent.

(2) Support the breechblock from below with the left hand, with the right hand depress the operating handle latch (B8437, fig. 5), and draw out the operating handle to the right. Raise the breechblock slightly and reach under the breech with the right hand and pull the operating crank (B8439) from between the breech ring lugs. Lower the breechblock about 1 inch, to allow the operating crank trunnions to slip out of their slots in the breechblock, and withdraw the operating crank.

14. Disassembly of firing mechanism from breech ring.—*a.* Reach into the breech recess from below, grasp the sear tripper (B8447, fig. 5) with the fingers, and pull it to the right to withdraw it from the trigger hub.

b. Insert the tip of the right forefinger upward between the trigger (B8446, fig. 5) and trigger plunger (A25209) and press the trigger plunger rearward to free the lug on the trigger. Holding the trigger plunger depressed, pull the trigger out to the left. The compression spring (FAAX1F) will force out the trigger plunger, which should be caught in the hand. The spring may be removed by means of a piece of wire or the tang of a small file.

15. Disassembly of breech ring from tube.—*a.* Remove the breech ring key locking screw (A25211, fig. 6) with a socket head set screw wrench. Lift out the breech ring locking key (A25210).

b. Remove the safety nut (BBSX4G) from the coupler key (A25215, fig. 5) and push the key (A25215) from its seat in the breech ring lugs and the recoil piston rod.

c. Slide the gun and sleigh rearward to obtain clearance for the breech ring and screw the breech ring off the tube.

NOTE.—Before beginning assembly, clean all parts thoroughly and coat with light lubricating oil.

16. Assembly of tube and breech ring.—With the tube assembled to the sleigh, and the sleigh drawn to the rear, screw the breech ring onto the tube until the breech faces of the tube and ring are flush and the keyseats on their upper sides are alined. Insert the key, and screw in the locking screw.

17. Assembly of firing mechanism into breechblock.—*a.* Set the breechblock (D36225, fig. 5) upright, with the T-slot at the bottom. Place the compression spring (sear) (FAAX1F) over the small end of the sear (B8445) and insert the sear and spring in the slotted left end of the transverse hole in the breechblock. Aline the arm of the sear with the slot and press the sear through against the spring until the pinhole through the small end of the shaft is exposed on the right side of the breechlock. Insert the sear retaining pin (BFDX1BF) through this hole, letting the ends project equally on both sides of the sear; then release the pressure on the sear, which will allow the pin to enter the counterbore in the breechblock.

b. Insert the cocking lever plunger spring (A25206, fig. 5) into its hole in the rear face of the recess in the left side of the breechblock. Press the cocking lever plunger (A25205) into the hole, flat end against the spring, and insert the firing pin cocking lever (B8443) into the recess, with the short arm downward and apron in front of the plunger.

18. Assembly of firing mechanism into breech ring.—*a.* Insert the trigger spring (FAAX1F, fig. 5), then the trigger plunger (A25209), into the hole in the rear face of the trigger notch in the lower left cheek of the breech ring. Press the plunger (A25209) into the hole with the nail of the right forefinger and slide the trigger hub into the hole at the top of the notch until the shoulder of the lever contacts the cheek of the ring; then release the plunger.

b. From inside the breech recess, insert the shaft of the tripper (B8447) into the hub of the trigger (B8446, fig. 5) with the short arm of the tripper vertical. Slide the trigger shaft through until the flattened end enters the slot in the trigger hub, and the lever of the tripper bottoms in its recess inside the breech ring.

c. To assemble the extractors, slide the extractors (B8441A and B, fig. 5) into their pivots inside the lower front corners of the breech recess, long arms upward and lips projecting toward the chamber.

NOTE.—From this point there are two methods of procedure in the assembly of the breechblock and firing parts. The preferred method is given in paragraphs 19 and 20. Paragraph 21 explains an alternative method.

19. Assembly of breechblock and operating mechanism to gun.—*a.* The preferred assembly is to bring the breechblock into the breech recess from below, before assembling the firing pin (A25201) and guide (A25200, fig. 5), firing spring (A25204) and retainer (B8444) into the breechblock.

b. Swing the extractor upper arms rearward to the limit of throw. Press the firing pin cocking lever (B8443, fig. 5) forward as far as it will go and insert the top of the breechblock into the bottom of the breech recess. Slide the breechblock upward and hold with the rear end of the T-slot exposed below the breech ring.

c. Slide the trunnions of the crank (B8439, fig. 5) into the T-slot from the rear, with the convex curve of the crank to the rear. Push the breechblock upward to approximately closed breech position with the left hand and swing the hub of the crank into position between the lugs on the bottom of the breech ring. Support the breechblock and crank with the left hand and with the right hand enter the shaft of the operating handle through the right hand lug into the hub of the crank. Shift the left hand to the crank hub and with the right hand rotate the handle to approximately 30° forward from vertical position to aline the splines of the handle shaft and crank hub. Adjust the axial alinement of the crank hub as required with the left hand and slide the handle shaft to the left through the hub and left hand lug to assembled position, rotating the handle rearward to clear the catch. Throw the operating handle forward to engage the catch.

d. Slide the forked end of the detent (A25213, fig. 5) horizontally into the groove in the left end of the handle shaft, with the knurled side of the tip outward. Spring the tip slightly outward and rotate the detent counterclockwise about the shaft until the hub enters its seat in the lug, completing the assembly.

e. To assemble the latch into the operating handle, insert the latch into the handle recess, hooked arm upward, guiding the spring into its bearing hole in the rear edge of the latch, and insert the pin.

f. Stake both ends of pin to retain it in position.

20. Assembly of firing pin and retainer into breechblock.—*a. Assembly of the firing pin and guide.*—(1) Insert the stop into the firing pin guide, pronged end first, and rotate until the prongs enter and protrude through the holes in the end of the guide.

(2) Place the retracing spring on the body of the firing pin and screw the firing pin into the guide through the rear end until the shoulder on the pin contacts the forward end of the guide on the inside. The point of the firing pin and the prongs of the stop will then protrude from the forward end of the guide. If the transverse locking pin holes in pin and guide are not in alinement, screw the firing pin backward, not to exceed one-half turn to aline the holes.

(3) Insert the locking pin through firing pin and guide. This pin should not protrude on either side of the guide.

b. Insert the firing pin (A25201, fig. 5) and guide (A25200) into the rear end of the firing pin hole in the breechblock, firing pin point first, and exterior lugs on bottom and left side of the guide in alinement with the grooves in the bore. Pull and hold the trigger (B8446) and push the pin and guide forward until it contacts the breechblock bushing (A25199); then release the trigger.

c. Place the firing spring (A25204, fig. 5) inside the guide, about the firing pin. Place the cupped end of the retainer (B8444) over the rear end of the spring, and insert the retainer into the firing pin hole of the breechblock with the arrows in the slot of the head approximately horizontal. With one hand press the retainer head forward against the spring until the top of the head is approximately one-eighth inch below the surface of the block and rotate it until the arrows are in alinement with the arrow on the face of the block; then release the pressure.

21. Alternative method of assembly.—*a.* Proceed as in paragraph 18 *a*, *b*, and *c*.

b. The firing mechanism may or may not be completely assembled into the breechblock prior to this operation. With the breechblock removed from the gun, proceed as in paragraph 20 *a*, *b*, and *c*, pressing the arm of the sear (B8445, fig. 5) into its recess instead of holding the trigger (B8446) to permit pushing the firing pin (A25201) and guide (A25200) forward to the breechblock bushing (A25199).

c. To assemble the breechblock from above, insert the bottom of the breechblock into the top of the breech recess and lower it carefully about 2 inches, pressing the arm of the sear into its recess to permit it to enter the breech ring. Insert one hand into the bottom

of the breech recess to support the breechblock and swing the lips of the extractors forward into their pockets and lower the breechblock until the rear end of the T-slot is exposed below the breech ring.

d. Proceed as in paragraph 19 *c.*

22. Disassembly of recoil mechanism.—Uncouple the gun by removing the safety nut (BBSX4G) and coupler key (A25215, fig. 5). Drain all oil from the recoil cylinder into a clean receptacle. Remove the recoil cylinder front head (B156653, fig. 7). Insert the piston rod removing spacer (A165919) (accessories) on the counterrecoil buffer (A163949) between head (B156653) and piston valve (A163950) and reassemble the recoil cylinder head. This will force the coupler (B153762) sufficiently to the rear to remove pin (BFDX1EU); unscrew the coupler from the piston rod. Attach the piston rod puller to the piston rod. Place a bar through the loop of the piston rod puller and with a man on each end of the bar keep the counter-recoil spring (A163742) under compression and remove the recoil cylinder front head (B156653). Gradually release the counterrecoil spring pressure. With the spring pressure released, unscrew the loop end on the puller and remove the piston and rod and counterrecoil springs from the recoil cylinder. Remove the end of the puller attached to the piston rod.

NOTE.—Care must be taken during the above operations to prevent injury to the piston rod packing.

23. Assembly of recoil mechanism.—Clean all parts thoroughly. Assemble in the reverse order of disassembly. Take great care to prevent entrance of dirt or foreign particles into the recoil cylinder. This condition will destroy the piston packing and cause malfunctioning of the mechanism.

24. Disassembly of apron latch mechanism from axle.—Remove the apron locking hook springs (A168728, fig. 17) from the apron locking hook spring pin (A168726) and apron locking hook (A168724). Remove the taper pin (BFCX1ED) from the apron locking hooks. Remove the apron locking mechanism shaft (A168727) and apron locking mechanism lever (A168725). Remove taper pin (BFCX1ED) from the apron locking mechanism lever (A168725) and pull lever from apron locking mechanism shaft.

25. Assembly of apron latch mechanism to axle.—Assemble the apron locking hook spring (A168728, fig. 17) to axle with apron locking hook spring pin (A168726). Assemble apron locking mechanism shaft (A168727) through the brackets, one on each side of the axle center, with the apron locking hooks (A168724), in place.

Connect the apron locking hook springs (A168728) to the apron locking hook (A168724), and to the apron locking hook spring pin (A168726). Secure the apron locking hooks (A168724) to the shaft (A168727) with taper pin (BFCX1ED). Assemble the apron locking mechanism lever (A168725) to shaft (A168727) and secure in position with taper pin (BFCX1ED).

26. Removal of segment latches from axle.—Remove cotter pin (BFAX1BB) washer (BEBX1G) from hinge pin (A157997, fig. 20), and remove hinge pin. Remove the segment locking plunger (A169304) and spring (A169305) from bracket on the axle. Remove cotter pin (BFAX1CD) washer (BEBX1K) from rod end pin (BFFX1D) and remove rod end pin. Remove segment locking plunger handle (B152588).

27. Assembly of segment latches to axle.—Assemble segment locking plunger handle (B152588, fig. 20) to the axle with rod end pin (BFFX1D) washer (BEBX1K), and cotter pin (BFAX1CD). Place the segment locking plunger spring (A169305) on the segment locking plunger (A169304) and insert into the bracket on the axle. Secure the end of the plunger (A169304) to handle (B152588) with hinge pin (A157997), washer (BEBX1G), and cotter pin (BFAX1BB).

28. Removal of wheels from axle.—Remove the disk and rim wheel from hub. Remove hub cap (B154392, fig. 19). Remove cotter pin (BFAX1DK) axle nut (A164092) and outer wheel bearing washer (A164055) from axle. Pull hub from axle. Care must be taken not to drop the roller bearings and oil retainer (A164938).

29. Assembly of wheels to axle.—Assemble taper roller bearings (A164091 and A164088) and oil retainer (A164938, fig. 19) in hub (C66188) and assemble the latter over the axle and secure it with outer wheel bearing washer (A164055), axle nut (A164092), and cotter pin (BFAX1DK). Assemble the hub cap and disk and rim wheel.

30. Removal of gun from sleigh.—Remove the set screw (A25212, fig. 6) from nut (B8448). Remove the nut with spanner wrench. Remove disk (A166315). Push the gun to the rear through the yokes of the sleigh. Remove key from front yoke of sleigh.

31. Assembly of gun to sleigh.—Push the gun through the yokes of the sleigh with key in place in front yoke. Assemble nut (B8448, fig. 6) and disk (A166315) and tighten with spanner wrench and lock with the set screw (A25212).

32. Removal of gun and sleigh from recoil mechanism.—Remove safety nut (BBSX4G) from coupler key (A25215, fig. 5). Remove the coupler key. Slide the gun and sleigh to the rear on the slide of the recoil cylinder and remove.

33. Assembly of gun and sleigh to recoil mechanism.—Slide the gun and sleigh forward on the slides of the recoil cylinder and secure with coupler key (A25215, fig. 5) inserted through the recoil piston rod and breech ring lugs. Assemble safety nut (BBSX4G) to the coupler key.

34. Removal of traveling lock from support.—Loosen jam nut (BBDX1D, fig. 14), and slip the traveling lock loop (A168534) from the nose of the traveling lock. Remove the cotter pin (BFAX1CR) and traveling lock hinge pin nut (A164058) from the traveling lock hinge pin (A164029). Remove the hinge pin (A164029) from the spindle support and remove the traveling lock.

35. Assembly of traveling lock to support.—Assemble the traveling lock (C67806, fig. 14) to the spindle support and secure it in position with traveling lock hinge pin (A164029) traveling lock hinge pin nut (A164058) and cotter pin (BFAX1CR). Adjust the traveling lock loop (A168534) so that it clamps securely to the recoil cylinder and lock it with the jam nut (BBDX1D).

36. Removal of firing mechanism.—Remove the cotter pin (BFAX1BB), washer (BEBX1F), and pin (BFEX1AD, fig. 9) from lever (B156941). Remove pin (A168110) and lever (B156941). Remove the firing mechanism plunger (A168109) and spring (A169128) from housing (B156940). Remove the cable and fittings (B156833) from threaded end of housing (B156940).

37. Assembly of firing mechanism.—Place firing mechanism spring (A169128, fig. 9) over the end of the cable with the threaded fitting and assemble firing mechanism plunger (A168109) to the end of the cable. Place plunger and spring in the housing (B156940) on the side of the recoil cylinder and screw the cable fittings in place. Connect the plunger to firing mechanism lever (B156941) with headless pin (BFEX1AD) and cotter pins (BFAX1BB). Assemble firing control plunger (A164271, fig. 10) to the other end of the cable and insert it in the bracket on the elevating mechanism support. Secure the cable fittings in place with set screw. Screw firing control eye (A164278) into the end of the plunger and connect to firing control link (B156472) with headless pin (BFEX1AH) and cotter pins (BFAX1BB).

NOTE.—Be sure that this mechanism operates freely.

38. Removal of apron, guards, and shield.—Remove apron (C68288, fig. 20) by removing the cotter pin and pin from the apron hinge. Remove the guards (B156668A and B) by removing the cap screws (BCBX1CA), and washers (BEAX1L) from the spindle support. Remove the shield (D33991, fig. 18) by removing nuts (BBBX1E), washer (BEAX2B), and screw (BCBX1EC).

39. Assembly of apron, guards, and shield.—Assemble the apron (C68288, fig. 20) to bracket under the axle with pins and cotter pins. Assemble the guards (B156668A and B) to the pintle support with cap screw (BCBX1CA), and shakeproof lock washers (BEAX1L). Assemble the shield (D33991, fig. 18) to the top carriage with cap screws (BCBX1EC), shakeproof lock washers (BEAX2B), and nuts BBBX1E. Assemble the shield braces (B154327) to top carriage with shakeproof lock washers (BEAX2B) and regular hexagon nuts (BBBX1E), and to shield with cap screws (BCBX1ED), lock washers (BEAX2B), and nuts (BBBX1E).

40. Disassembly of traversing quick release mechanism.—*a.* Remove the hexagon nut (BBBX1A, fig. 12) and unscrew the traversing mechanism lever rod (A168985) from the rod end yoke (EEAX1B). Remove cotter pin (BFAX1CC, fig. 13), and headless pin (BFEX1BH). Remove the rod end yoke (EEAX1B, fig. 12) assembled to the traversing mechanism lever assembly. Remove the three cap screws (BCBX1BA, fig. 13) from traversing mechanism cover (C66447) and remove cover and parts assembled thereto.

b. Disassemble the traversing mechanism upper cap (A164381, fig. 13) by removing the headless set screw (BCUX2QG). Unscrew the cap from the traversing mechanism clutch (B154049). Remove the traversing mechanism clutch (B154049) and the traversing mechanism spring (A164565) from the interior of the traversing mechanism cover (C66447).

41. Assembly of traversing quick release mechanism.—Assemble in the reverse order of disassembly.

42. Disassembly of traversing mechanism.—*a.* Disassemble the traversing quick release mechanism (par. 40). To remove the traversing worm (B156608, fig. 13) remove the cotter pin (BFAX1DK, fig. 12) from flexible joint (A138006) at the end of the worm. Remove the ball bearing retainer lock screw (A138041, fig. 13) and unscrew the worm bearing retainer (B154017) from its seat. Screw the traversing worm (B156608) and its ball bearing (A1186) from their housing.

b. To remove the (traversing) worm wheel (B156607, fig. 13) and traversing mechanism pinion (B154050), remove the set screw (BCTX1BD) from the traversing mechanism lower cap (A164153) and remove the cap from its seat. Remove the traversing mechanism pinion lower nut (A164384) from the traversing mechanism pinion (B154050). Remove the ball bearing (A164155) from its seat. Push up on the traversing mechanism pinion (B154050) and remove it and its allied parts from the top of the worm wheel housing.

c. Remove the cotter pin (BFAX1DT, fig. 8) and pintle nut (A168709). Remove the machine screw (BCFX2DC), and remove the support swivel pin (B156527). Remove the pintle support piece (C67808). Remove the pintle nut washer (A168543), and the pintle housing lower washer (A168536). Lift off the top carriage and place bottom side up. Remove the roller bearings (A168485 and A168486) from the pintle support (D33979). Remove the traversing arc stop screw (A164196), nine cap screws (BCBX5B), and lock washers (BEAX1H) and remove the traversing gear box cover (C67770) traversing gear box cover gasket (B156585) and oil retainer (A168502). Remove the traversing arc (B156648)and pintle housing upper washer (A168535).

43. Assembly of traversing mechanism.—Assemble in the reverse order of disassembly.

44. Disassembly of elevating mechanism.—*a.* Disconnect the traversing quick release mechanism by unscrewing the hexagon nut (BBBX1A, fig. 12), and unscrewing the traversing mechanism lever rod (A168985) from the rod end yoke (EEAX1B). Remove the cotter pin from the flexible joint (A138006) and remove the traversing shaft (A164513) by pulling straight back on the handwheel assembly (C66338).

b. Remove the firing control link (B156472, fig. 10). Remove the set screw (BCTX2K) from plunger housing. Remove the cotter pin (BFAX1BB) and headless pin (BFEX1AH) from the firing control eye (A164278) and unscrew the eye from the firing control plunger (A164271). Withdraw the flexible cable and firing control plunger from their housing. Remove the set screw (BCTX1BB), from the elevating gear housing welded to the top carriage. Remove the elevating and firing controls support (C68000) by using an adjustable wrench on the hexagon nut which is screwed on the support. Remove straight pin (BFDX2AC) from firing control

disk (A169352), and withdraw firing plunger (A168126). Remove straight pin (BFDX1CR) from elevating knob (B156839) and tap knob gently to the rear. Remove the key (BGBX1) from the long shaft gear (B156659). Remove the elevating mechanism serrated nut (A168967). Remove the straight pin (BFDX1DP) from the shaft gear collar (A168971). Remove the long shaft gear (B156659), from elevating and firing control support (C68000).

c. Remove the elevating mechanism bracket (B154015, fig. 11), by removing the three cap screws (BCBX3CB). Grasp the elevating gear case and pull it to the right. To disassemble the short shaft gear (B156624), remove the cotter pin (BFAX1BE) and short shaft gear nut (A164191). Remove the transfer bevel gear (A168654), and thrust bearing (A168684). Unscrew the elevating screw (B156639), from the elevating gear case. Remove the gear case cap (A164190), and the felt washer (A164396). Remove the set screw (BCTX1BB), from the elevating screw thimble (A168665), and remove the thimble and the thimble cup (A168652). Remove the six cap screws (BCBX1BD), and lock washers (BEAX1K) from the right half gear case (C67814) and remove the case. Remove the elevating screw bevel gear (A168655) and elevating screw gear washer (A169679). Now the short shaft gear (B156624) and thrust bearing (A168684) can be removed.

45. Assembly of elevating mechanism.—Assemble in reverse order of disassembly.

Caution.—In assembling the short shaft gear, tighten the short shaft gear nut (A164191, fig. 11) just enough to eliminate end play of the short shaft gear, but not so tight as to cause binding of the thrust bearings (A168684).

46. Disassembly of trails from support.—Elevate the gun to about 5°. Lift the trails off the ground and place a support beneath the muzzle of the gun. Block under one trail to keep this relationship. Remove nut (BBFX2C, fig. 15) and hinge pin (B156552), care being taken not to damage needle point bearings, and remove trail from support. Remove the other trail in similar manner.

47. Assembly of trails to support.—Reverse operation of disassembly.

48. Disassembly of trail lock.—The trail lock (fig. 16) rigidly secures the trails for traveling. Disassembling and assembling operations are so simple that no instructions are required, as evidenced by referring to figure 16.

SECTION V

TOOLS FOR MAINTENANCE AND REPAIR

	Paragraph
General	49
Chest, steel, M6	50
Puller, piston rod	51
Spacer, piston rod removing	52

49. General.—There are a number of tools provided for maintenance, repair, and adjustment of this matériel, such as chisels, drifts, files, hammers, pliers, screw drivers, punches, and wrenches, the name or general characteristics of which indicate their uses and application. Therefore, detailed description and method of use thereof are not contained herein. Those tools, however, which are of special design and not commonly used are described and their use outlined in paragraphs following.

50. Chest, steel, M6.—The chest is of commercial type and is listed as chest, steel, type A, 22 by 8 by 9 inches, with tray (STAX1D). It is equipped with a multiple change lock with two keys, two side catches, and a full grip leather or metal handle on top of the lid.

51. Puller, piston rod.—The piston rod puller (fig. 21) is for the purpose of facilitating the disassembly and assembly of the recoil mechanism. The puller is screwed to the piston rod. A bar is placed through the eye and force is applied to compress the counter-recoil springs, thereby allowing the head of the recoil cylinder to be removed. The spring pressure is then released and parts within the cylinder removed.

52. Spacer, piston rod removing.—The spacer is for the purpose of facilitating the removal of the pin which secures the coupler to the end of the piston rod.

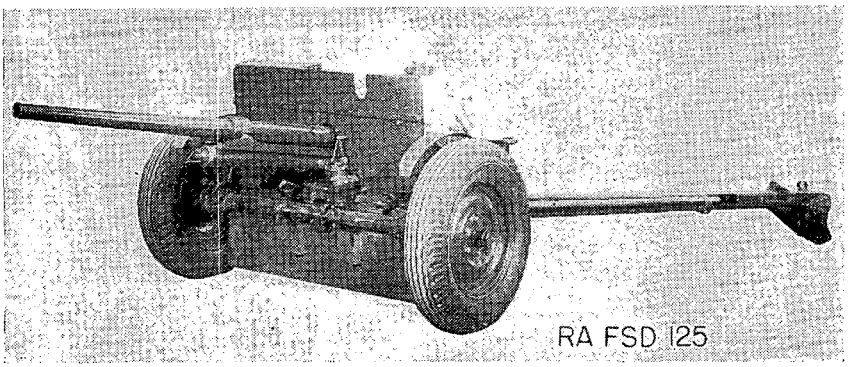

FIGURE 1.—37-mm gun carriage, M4—firing position, front view

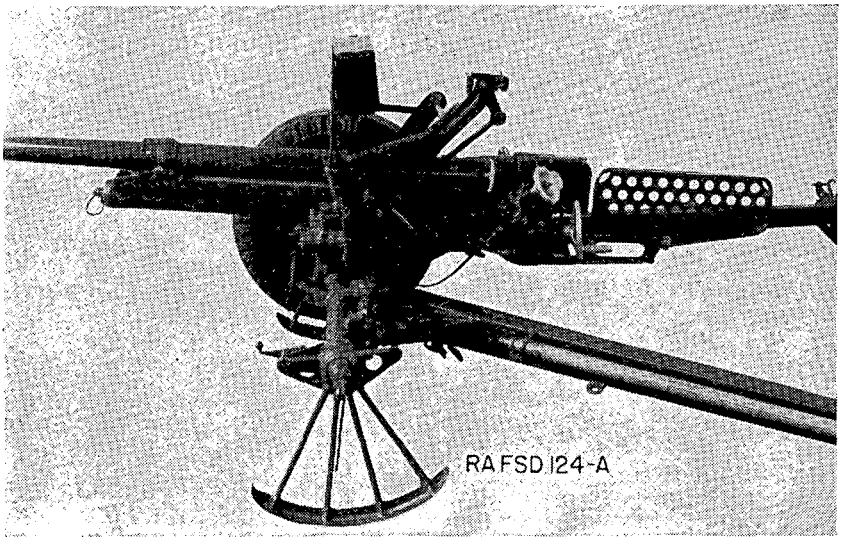

FIGURE 2.—37-mm gun carriage, M4—firing position (left wheel removed), left side view.

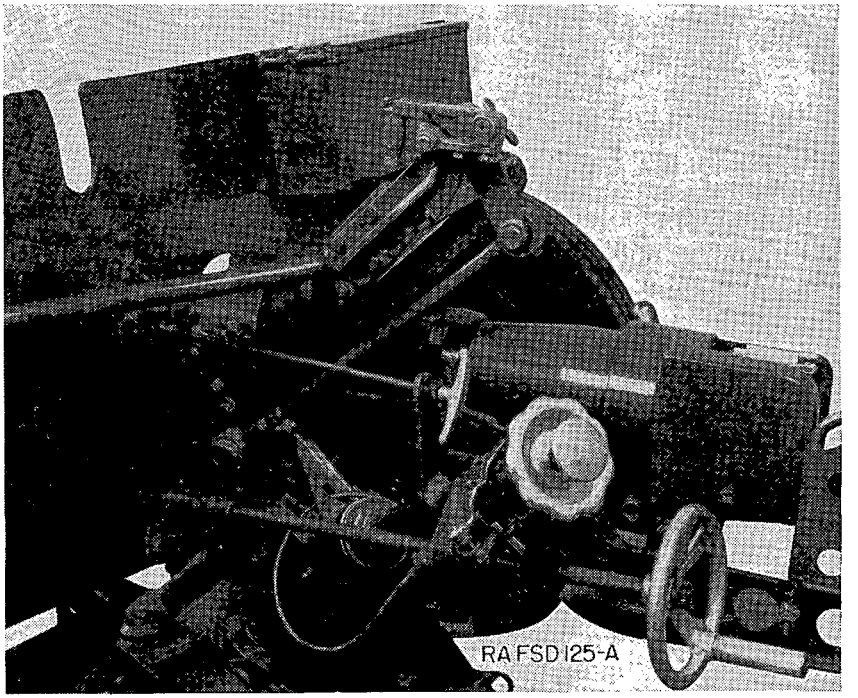

FIGURE 3.—37-mm gun carriage, M4—left side view.

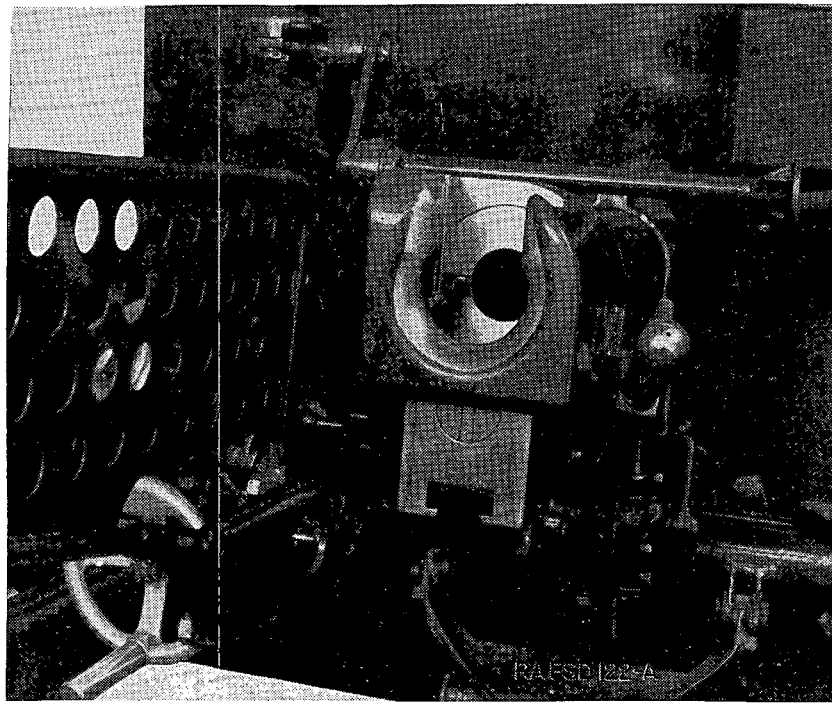

FIGURE 4.—37-mm gun breech mechanism—rear view.

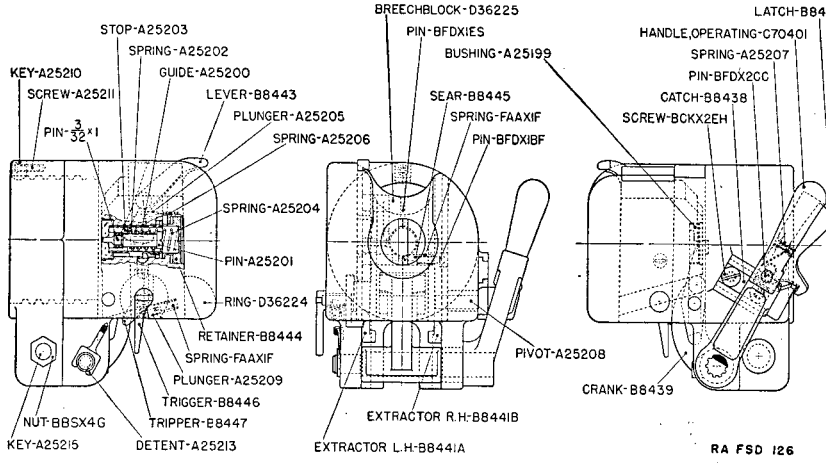

FIGURE 5.—37-mm gun, M3—breech mechanism.

Reference	*Item*
D36225	Breechblock.
A25199	Bushing, breechblock.
B8438	Catch, operating handle.

Reference	*Item*
B8439	Crank, operating.
A25213	Detent, operating handle.
B8441A	Extractor, L. H.
B8441B	Extractor, R. H.
A25200	Guide, firing pin.
C70401	Handle, operating, assembly.
A25215	Key, coupler.
A25210	Key, locking, breech ring.
B8437	Latch, operating handle.
B8443	Lever, cocking, firing pin.
BBSX4G	Nut, safety, S., 5/8–18NF-3.
A25201	Pin, firing.
BFDX1BF	Pin, straight, S., 3/32 by 7/16.
——	Pin, straight, S., 3/32 by 1.
BFDX1ES	Pin, straight, S., 3/16 by 1 1/8.
BFDX2CC	Pin, straight, S., 3/8 by 1.
A25208	Pivot, extractor.
A25205	Plunger, cocking lever.
A25209	Plunger, trigger.
B8444	Retainer, firing spring.
D36224	Ring, breech.
A25211	Screw, breech ring locking key.
BCKX2EH	Screw, mach., fl-hd., S., 3/8–16NC-2 by 7/8.
B8445	Sear.
A25206	Spring, cocking lever plunger.
FAAX1F	Spring, compression, 0.037 diam. stock, 0.370 O. D., 8 coils.
A25204	Spring, firing.
A25207	Spring, operating handle latch.
A25202	Spring, retracting, firing pin.
A25203	Stop, firing spring.
B8446	Trigger.
B8447	Tripper, sear.

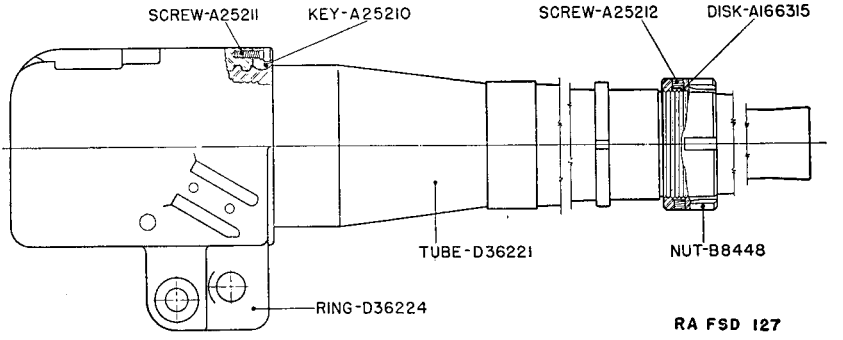

FIGURE 6.—37-mm gun, M3.

Reference	*Item*
A166315	Disk, tube locking nut.
A25210	Key, locking, breech ring.
B8448	Nut, locking, tube.
D36224	Ring, breech.
A25211	Screw, breech ring locking key.
A25212	Screw, set, socket-hd., fl-pt., alloy-S., 3/8–16NC-3 by 5/16.
D36221	Tube.

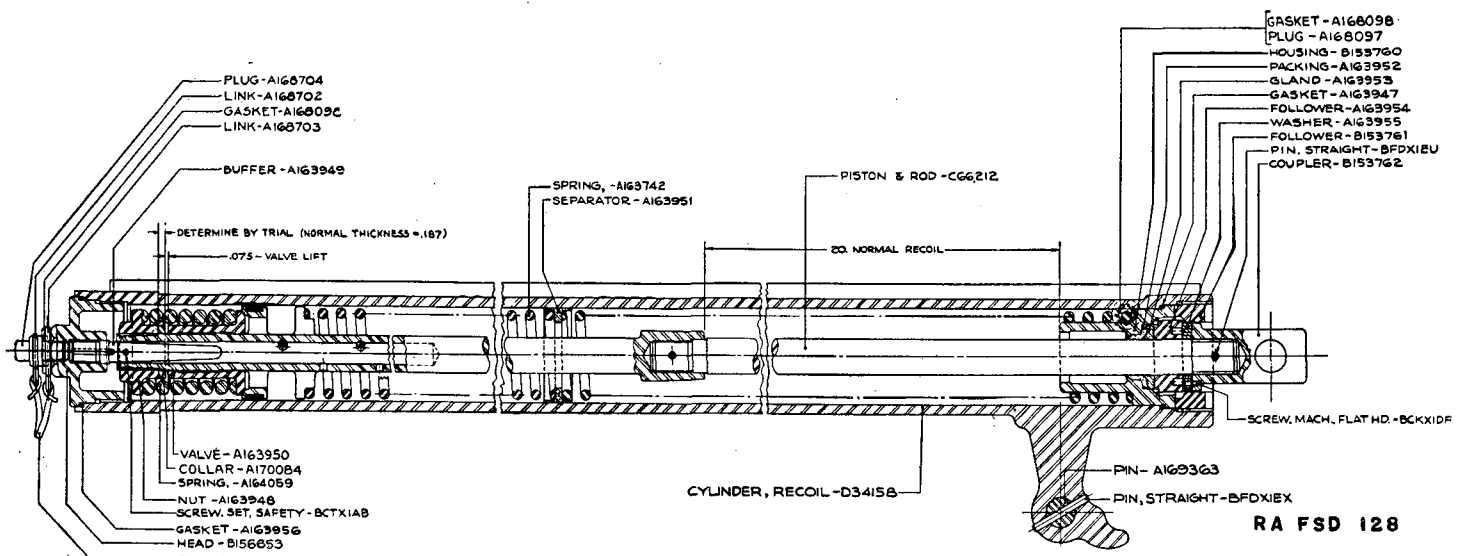

FIGURE 7.—37-mm gun carriage, M4—recoil mechanism.

Reference	*Item*
A163949	Buffer, counterrecoil.
A170084	Collar, spacing, piston valve.
B153762	Coupler, piston.
D34158	Cylinder, recoil.
A163954	Follower, piston packing gland.
B153761	Follower, piston packing housing.
A168098	Gasket, cop., 9/16 I. D. by 3/4 O. D. by 1/8 thick.
A163947	Gasket, cop., 2 3/8 I. D. by 2 9/16 O. D. by 1/8 thick.
A163956	Gasket, cop., 2 9/16 I. D. by 2 3/4 O. D. by 1/8 thick.
A163953	Gland, piston packing.
B156653	Head, recoil cylinder.
B153760	Housing, piston packing.
A168703	Link, recoil cylinder head.
A168702	Link, recoil cylinder head plug.
A163948	Nut, piston valve.
A163952	Packing, piston.
BFDX1EU	Pin, straight, S., 3/16 by 1 3/8.
BFDX1EX	Pin, straight, S., 3/16 by 1 5/8.
A169363	Pin, straight, S., 7/8 by 2.
C66212	Piston and rod assembly.
A168097	Plug, recoil cylinder.
A168704	Plug, recoil cylinder head.
BCKX1DF	Screw, mach., fl-hd., S., No. 5 (0.125)–40NC–2 by 7/16.
BCTX1AB	Screw, set, socket-hd., cup-pt., alloy-S., No. 10 (0.190)–24NC–3 by 1/4.
A163951	Separator, counterrecoil spring.
A163742	Spring, counterrecoil.
A164059	Spring, piston valve.
A17950	Thong, latigo leather, 3/16 by 9 by 1/8 thick.
A163950	Valve, piston.
A163955	Washer, piston coupler.

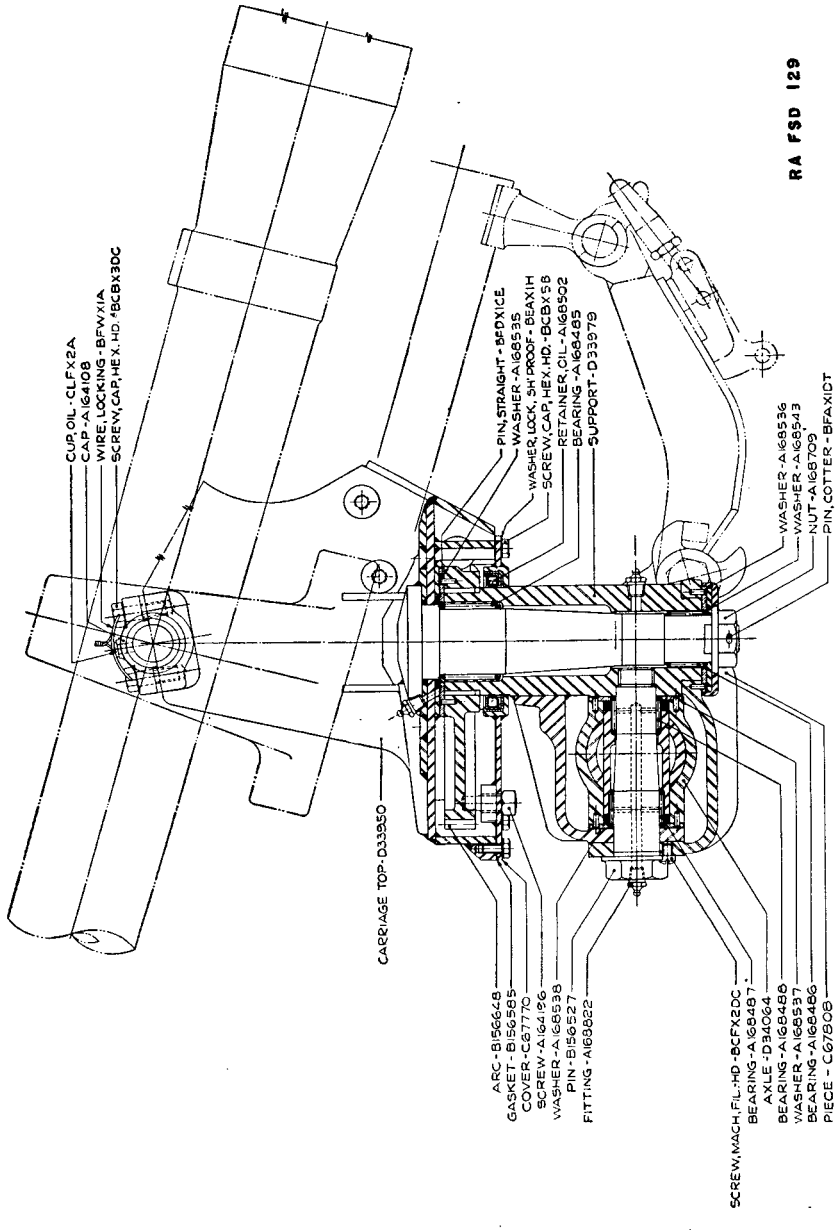

FIGURE 8.—37-mm gun carriage, M4—pintle.

Reference	*Item*
B156648	Arc, traversing.
D34064	Axle (welded construction).
A168488	Bearing, roller, needle type, 41 rolls, 1.0 bore, 1.25 O. D., 1.0 width.
A168487	Bearing, roller, needle type, 43 rolls, 1.125 bore, 1.375 O. D., 1.0 width.
A168485	Bearing, roller, needle type, 43 rolls, 1.750 bore, 2.125 O. D., 1.5 width.
A168486	Bearing, roller, needle type, 47 rolls, 1.250 bore, 1.5 O. D., 1.0 width.
A164108	Cap, trunnion.
D33950	Carriage, top (welded construction).
C67770	Cover, traversing gear box (welded construction).
CLFX2A	Cup, oil, drive type, ¼-in. diam.
A168822	Fitting, lubr., rd-hd. type, straight, ⅛-27NPT, male.
B156585	Gasket, traversing gear box cover.
A168709	Nut, pintle.
C67808	Piece, pintle support.
BFAX1DT	Pin, cotter, split, S., ⅛ by 2.
BFDX1CE	Pin, straight, S., ⅛ by ⅜.
B156527	Pin, swivel, support.
A168502	Retainer, oil, 2.875 I. D. by 3.754 O. D. by ½ wide.
BCBX5B	Screw, cap, hex-hd., ¼–28NF–2 by ½.
BCBX3DC	Screw, cap, hex-hd., 7/16–20NF–2 by 1.
BCFX2DC	Screw, mach., oval-fil-hd., ¼–20NC–2 by 5/16.
A164196	Screw, stop, traversing arc.
D33979	Support, pintle (welded construction).
A168537	Washer, axle sleeve, inner.
A168538	Washer, axle sleeve, outer.
BEAX1H	Washer, lock, shakeproof No. 12 type, ¼-in.
A168536	Washer, pintle housing, lower.
A168535	Washer, pintle housing, upper.
A168543	Washer, pintle nut.
BFWX1A	Wire, locking.

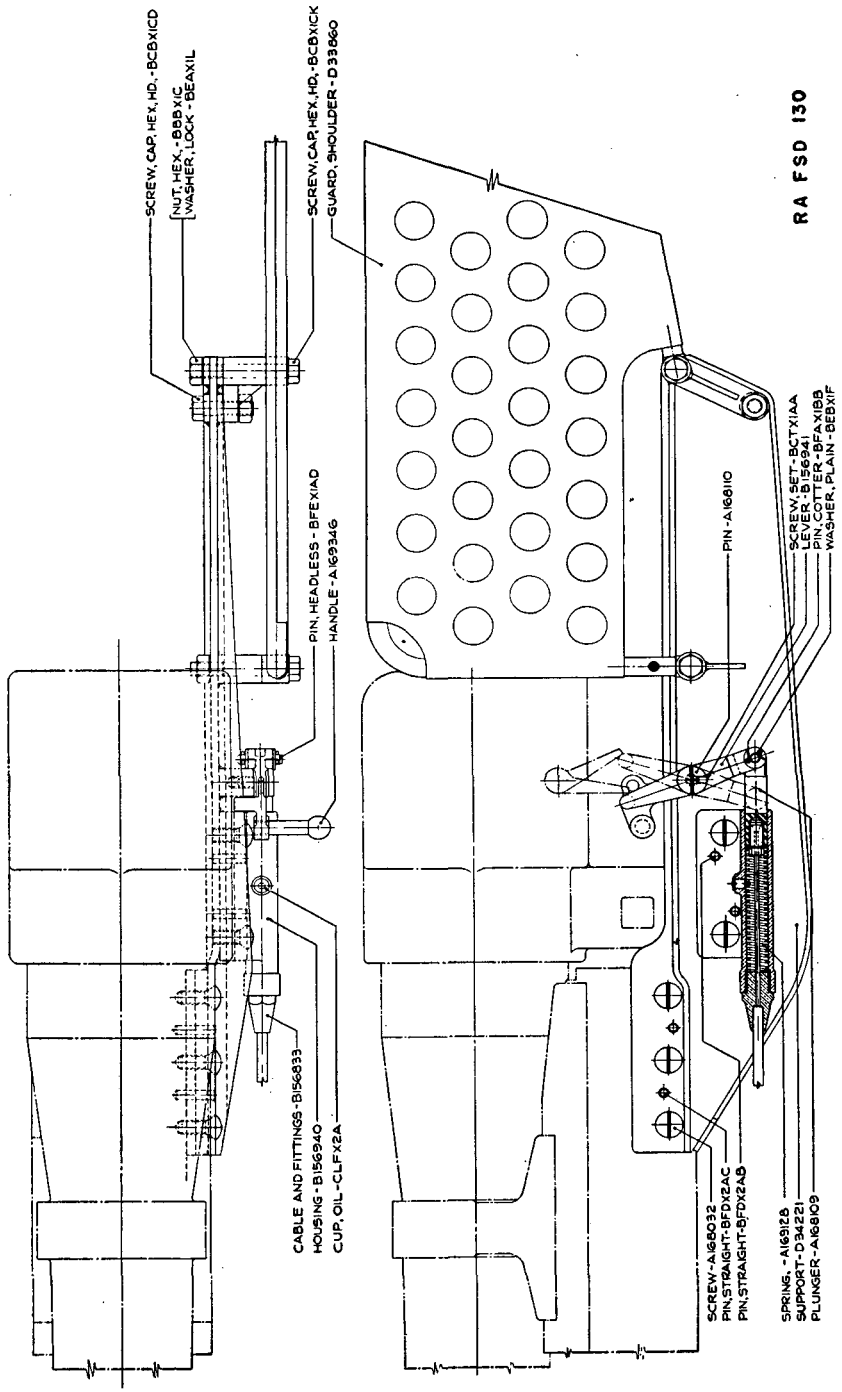

FIGURE 9.—37-mm gun carriage, M4—firing mechanism.

Reference	*Item*
B156833	Cable and fittings, assembly.
CLFX2A	Cup, oil, drive type, ¼-in. diam.
D33860	Guard, shoulder (welded construction).
A169346	Handle, firing mechanism lever.
B156940	Housing, cable and fittings.
B156941	Lever, firing mechanism.
BBBX1C	Nut, reg., hex., s-fin., ⅜-24NF-2.
BFAX1BB	Pin, cotter, split, S., 1/16 by 7/16.
A168110	Pin, firing mechanism lever.
BFEX1AD	Pin, hdls., S., ¼ diam. by 0.800 clear.
BFDX2AB	Pin, straight, S., ¼ by ⅞.
BFDX2AC	Pin, straight, S., ¼ by 1.
A168109	Plunger, firing mechanism.
BCBX1CD	Screw, cap, hex-hd., ⅜-24NF-2 by 1¼.
BCBX1CK	Screw, cap, hex-hd., ⅜-24NF-2 by 2½.
A168032	Screw, oval-ck-hd., ⅜-24NF-3 by 2 7/32.
BCTX1AA	Screw, set. socket-hd., cup-pt., alloy-S., No. 10 (0.190)-24NC-3 by 3/16.
A169128	Spring, firing mechanism.
D34221	Support, shoulder guard (welded construction).
BEAX1L	Washer, lock, Shakeproof No. 12 type, ⅜-in.
BEBX1F	Washer, plain, S., No. 12 (0.216).

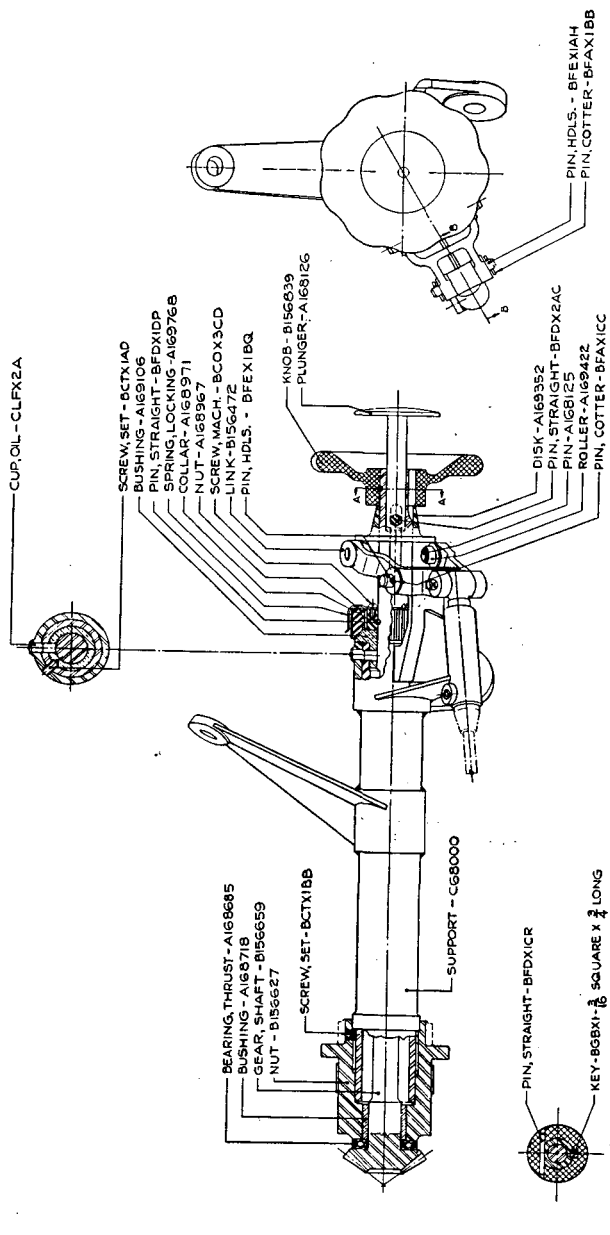

FIGURE 10.—37-mm gun carriage, M4—elevating und firing controls.

Reference	*Item*
A168685	Bearing, thrust, 0.752 bore, 1.5 O. D., 0.25 width.
A168718	Bushing, coupling nut.
A169106	Bushing, elevating and firing controls support.
A168971	Collar, shaft gear.
CLFX2A	Cup, oil, drive type, ¼-in. diam.
A169352	Disk, firing control.
A164278	Eye, firing control.
B156659	Gear, shaft, long.
BGBX1	Key, 3/16 square by ¾.
B156839	Knob, elevating.
B156472	Link, firing control.
B156627	Nut, coupling.
A168967	Nut, serrated, elevating mechanism.
BFAX1BB	Pin, cotter, split, S., 1/16 by 7/16.
BFAX1CC	Pin, cotter, split, S., 3/32 by ½.
A168125	Pin, firing control link roller.
BFEX1BQ	Pin, hdls., S., 5/16 diam. by 2.05 clear.
BFEX1AH	Pin, hdls., S., ¼ diam. by 1.3 clear.
BFDX1CR	Pin, straight, S., ⅛ by 1.
BFDX1DP	Pin, straight, S., 5/32 by ⅞.
BFDX2AC	Pin, straight, S., ¼ by 1.
A168126	Plunger, firing.
A164271	Plunger, firing control.
A169422	Roller, firing control link.
BCOX3CD	Screw, mach., rd-hd., cor-res-S., No. 5 (0.125)-44NF-3 by ¼.
BCTX1AD	Screw, set, socket-hd., cup-pt., alloy-S., No. 10 (0.190)-24NC-3 by ⅜.
BCTX1BB	Screw, set, socket-hd., cup-pt., alloy-S., ¼-20NC-3 by ¼.
BCTX2K	Screw, set, socket-hd., rd-pt., alloy-S., ¼-20NC-3 by ⅜.
A169768	Spring, locking, elevating mechanism.
C68000	Support, elevating and firing controls.

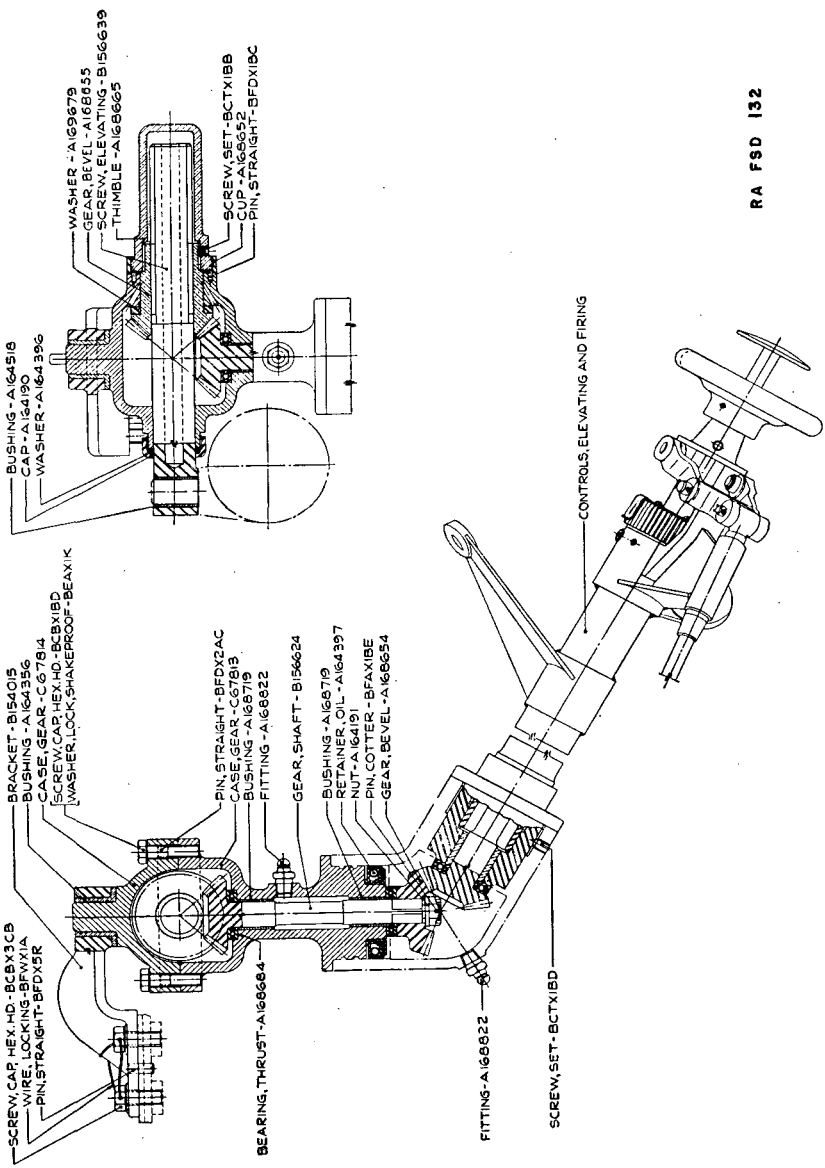

FIGURE 11.—37-mm gun carriage, M4—elevating mechanism.

Reference	*Item*
A168684	Bearing, thrust, 0.627 bore, 1.25 O. D., 0.25 width.
B154015	Bracket, elevating mechanism.
A164356	Bushing, elevating mechanism bracket.
A164518	Bushing, elevating screw.
A168719	Bushing, gear case.
A164190	Cap, gear case.
C67813	Case, gear, left half.
C67814	Case, gear, right half.
A168652	Cup, thimble.
A168822	Fitting, lubr., rd-hd. type, straight, ⅛–27NPT, male.
A168655	Gear, bevel, elevating screw.
A168654	Gear, bevel, transfer
B156624	Gear, shaft, short.
A164191	Nut, short shaft gear.
BFAX1BE	Pin, cotter, split, S., 1/16 by ¾.
BFDX1BC	Pin, straight, S., 3/32 by ¼.
BFDX5R	Pin, straight, S., ¼ by ⅝.
BFDX2AC	Pin, straight, S., ¼ by 1.
A164397	Retainer, oil, 1.37 I. D. by 2.375 O. D. by ½ wide.
BCBX3CB	Screw, cap, hex-hd., ⅜–24NF–2 by ⅞.
BCBX1BD	Screw, cap, hex-hd., 5/16–24NF–2 by 1¼.
B156639	Screw, elevating.
BCTX1BB	Screw, set, socket-hd., cup-pt., alloy-S., ¼–20NC–3 by ¼.
BCTX1BD	Screw, set, socket-hd., cup-pt., alloy-S., ¼–20NC–3 by ⅜.
A168665	Thimble, elevating screw.
A169679	Washer, elevating screw gear.
A164396	Washer, felt, 1.0 I. D. by 1¼ O. D. by 3/16 thick.
BEAX1K	Washer, lock, shakeproof No. 12 type, 5/16-in.
BFWX1A	Wire, locking.

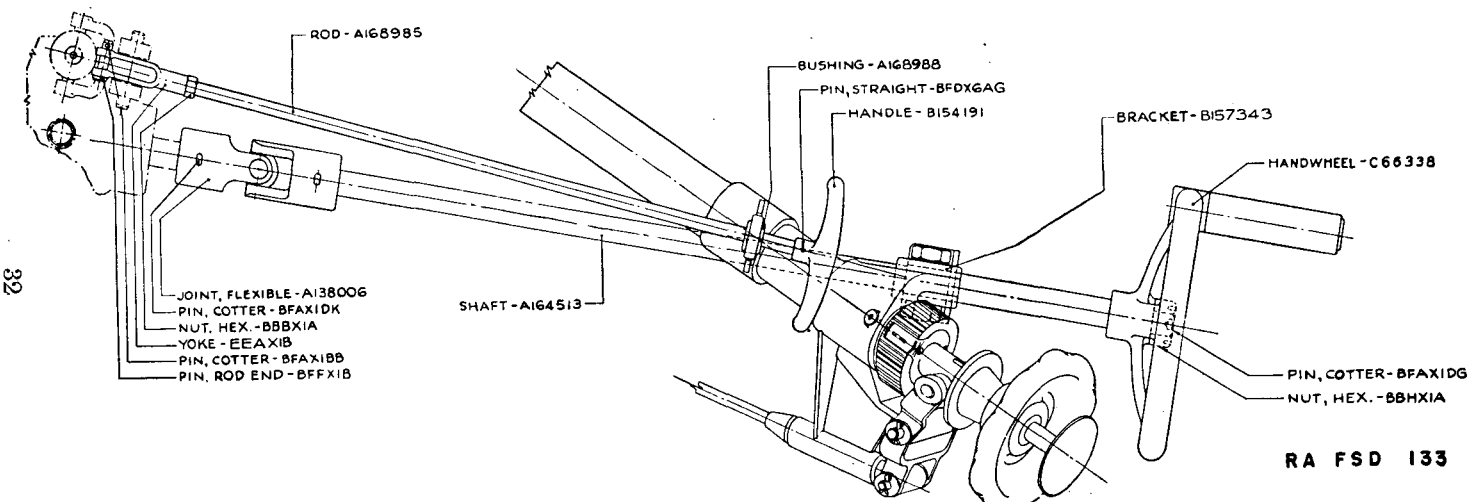

FIGURE 12.—37-mm gun carriage, M4—traversing controls.

Reference	*Item*
B157343	Bracket.
A168988	Bushing, traversing mechanism lever rod.
B154191	Handle, traversing mechanism lever rod.
C66338	Handwheel assembly.
A138006	Joint, flexible.
BBBX1A	Nut, reg., hex., s-fin., ¼-28NF-2.
BBHX1A	Nut, slotted, s-fin., ½-20NF-2.
BFAX1BB	Pin, cotter, split, S., 1/16 by 7/16.
BFAX1DG	Pin, cotter, split, S., ⅛ by 1.
BFAX1DK	Pin, cotter, split, S., ⅛ by 1½.
BFFX1B	Pin, rod end, ¼-in. diam.
BFDX6AG	Pin, straight, br., 1/16 by ½.
A168985	Rod, traversing mechanism lever.
A164513	Shaft, traversing.
EEAX1B	Yoke, rod end, ¼-in.

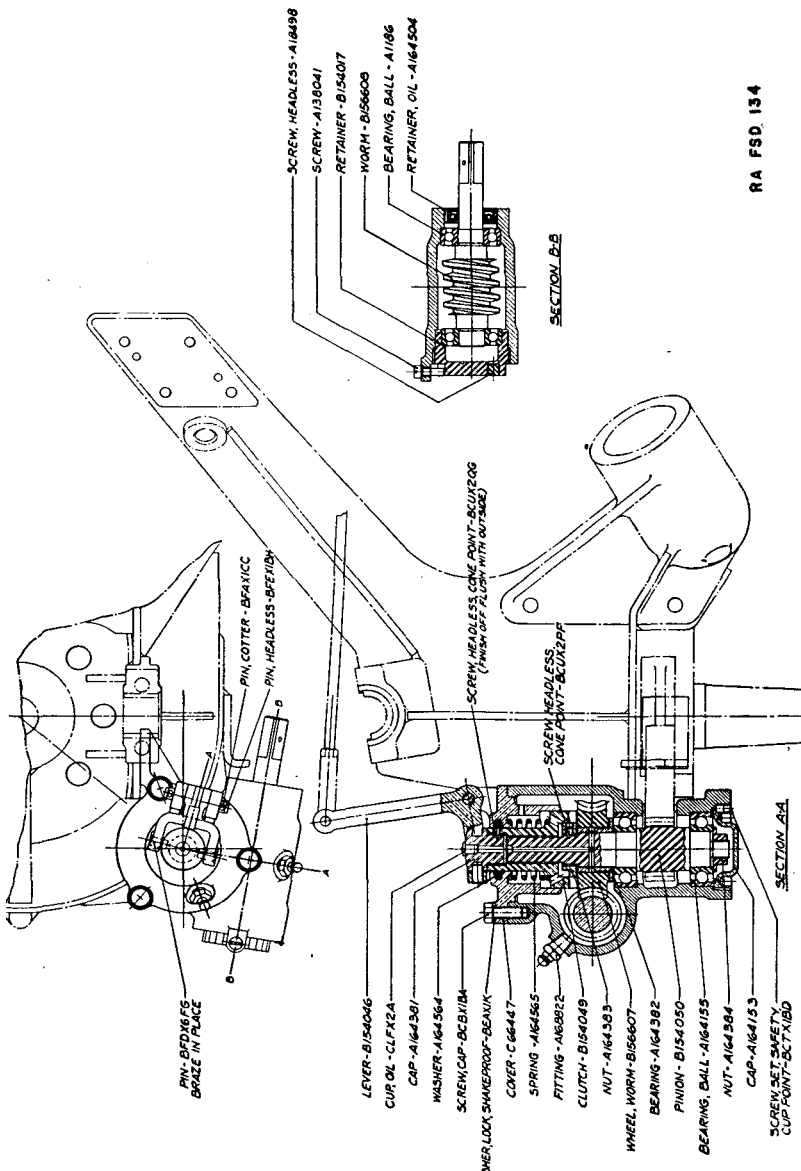

FIGURE 13.—37-mm gun carriage, M4—traversing mechanism.

Reference	*Item*
A1186	Bearing, ball, 0.6693 bore, 1.5748 O. D., 0.4724 width.
A164155	Bearing, ball, 0.9839 bore, 2.0472 O. D., 0.5936 width.
A164382	Bearing, worm wheel.
A164153	Cap, traversing mechanism, lower.
A164381	Cap, traversing mechanism, upper.
B154049	Clutch, traversing mechanism.
C66447	Cover, traversing mechanism.
CLFX2A	Cup, oil, drive type, ¼-in. diam.
A168822	Fitting, lubr., rd-hd. type, straight, ⅛-27NPT, male.
B154046	Lever, traversing mechanism.
A164384	Nut, traversing mechanism pinion, lower.
A164383	Nut, traversing mechanism pinion, upper.
BFAX1CC	Pin, cotter, split, S., 3/32 by ½.
BFEX1BH	Pin, hdls., S., 5/16 diam. by 1.30 clear.
BFDX6FG	Pin, straight, br., ¼ by ½.
B154050	Pinion, traversing mechanism.
A164504	Retainer, oil, 0.625 I. D. by 1.381 O. D. by 13/32 wide.
B154017	Retainer, worm bearing.
BCBX1BA	Screw, cap, hex-hd., 5/16-24 NF-2 by ¾.
A18498	Screw, hdls., S., 5/16-24NF-2 by 5/16.
A138041	Screw, lock, ball bearing retainer.
BCUX2QG	Screw, set, hdls., cone-pt., br., No. 8 (0.164)-36NF-3 by ⅜.
BCUX2PF	Screw, set, hdls., cone-pt., cor-res-S., No. 8 (0.164)-36NF-3 by 5/16.
BCTX1BD	Screw, set, socket-hd., cup-pt., alloy-S., ¼-20NC-3 by ⅜.
A164565	Spring, traversing mechanism.
A164564	Washer, felt, 15/32 I. D. by 1⅝ O. D. by ¼ thick.
BEAX1K	Washer, lock, shakeproof No. 12 type, 7/16-in.
B156607	Wheel, worm.
B156608	Worm, traversing.

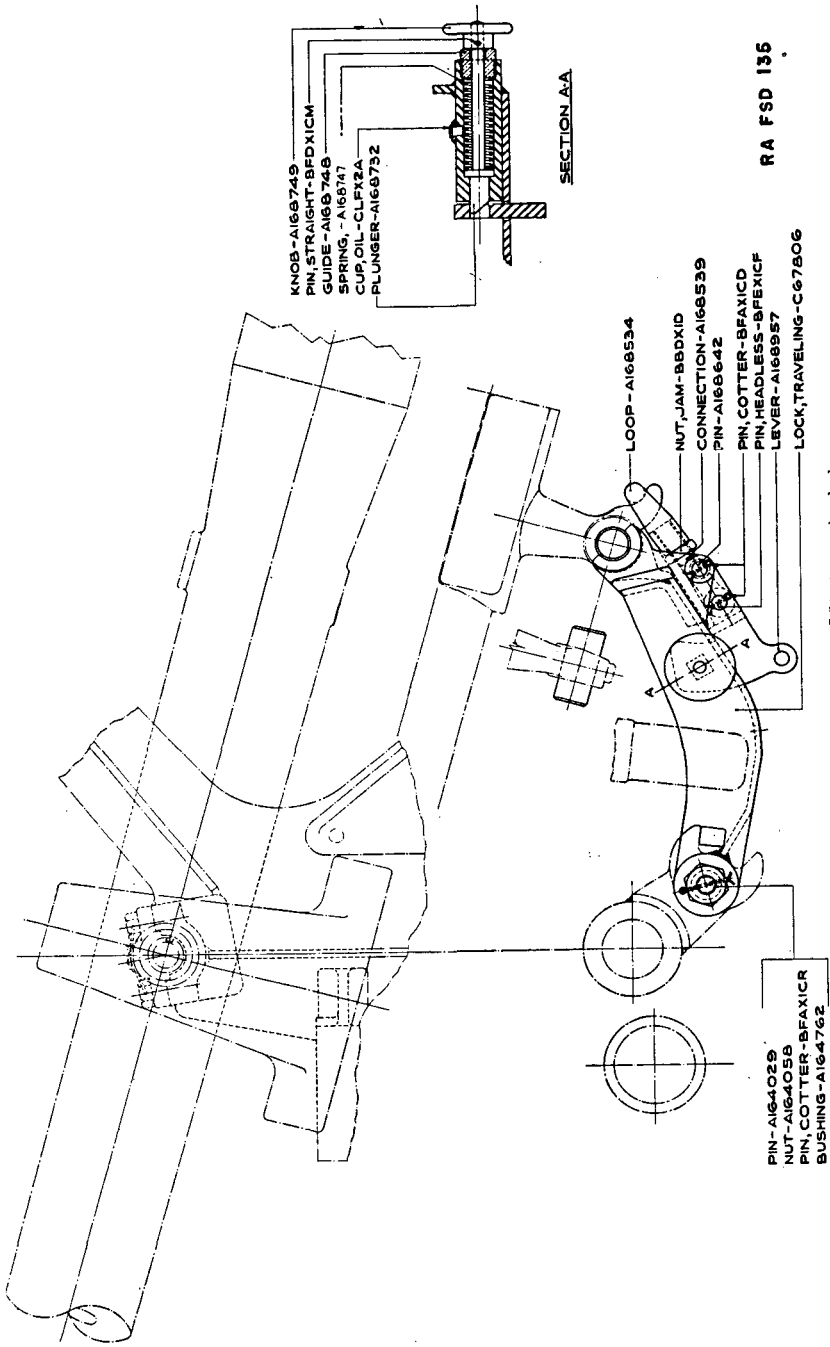

FIGURE 14.—37-mm gun carriage, M4—traversing lock.

Reference	*Item*
A164762	Bushing, traveling lock hinge pin.
A168539	Connection, traveling lock lever.
CLFX2A	Cup, oil, drive type, ¼-in. diam.
A168748	Guide, traveling lock lever plunger.
A168749	Knob, traveling lock lever plunger.
A168957	Lever, traveling lock (welded construction).
C67806	Lock, traveling (welded construction).
A168534	Loop, traveling lock.
BBDX1D	Nut, jam, hex., s-fin., 7/16-20NF-2.
A164058	Nut, traveling lock hinge pin.
BFAX1CD	Pin, cotter, split, S., 3/32 by 5/8.
BFAX1CR	Pin, cotter, split, S., 3/32 by 1¼.
BFEX1CF	Pin, hdls., S., 3/8 diam., by 1.05 clear.
A164029	Pin, hinge, traveling lock.
BFDX1CM	Pin, straight, S., ⅛ by ¾.
A168642	Pin, traveling lock.
A168732	Plunger, traveling lock lever.
A168747	Spring, traveling lock lever plunger.

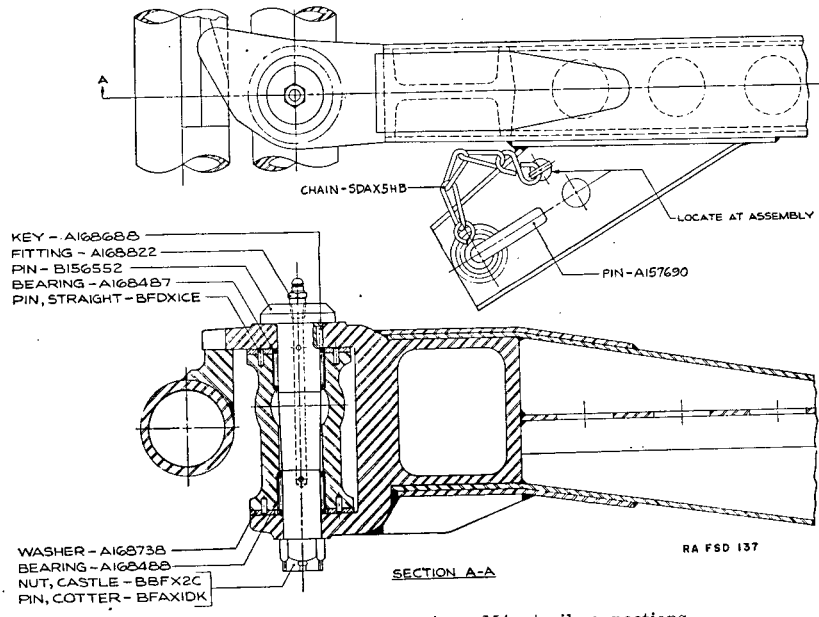

FIGURE 15.—37-mm gun carriage, M4—trail connections.

Reference	*Item*
A168488	Bearing, roller, needle type, 41 rolls, 1.0 bore, 1.25 O. D., 1.0 width.
A168487	Bearing, roller, needle type, 43 rolls, 1.125 bore, 1.375 O. D., 1.0 width.
SDAX5HB	Chain, assembly "H", 3-in.
A168822	Fitting, lubr., rd-hd. type, straight, ⅛-27NPT, male.
A168688	Key, trail hinge pin.
BBFX2C	Nut, castle, ¾-16NF-2.
BFAX1DK	Pin, cotter, split, S., ⅛ by 1½.
B156552	Pin, hinge, trail.
BFDX1CE	Pin, straight, S., ⅛ by ⅜.
A157690	Pin, trail lock.
A168738	Washer, trail hinge bearing

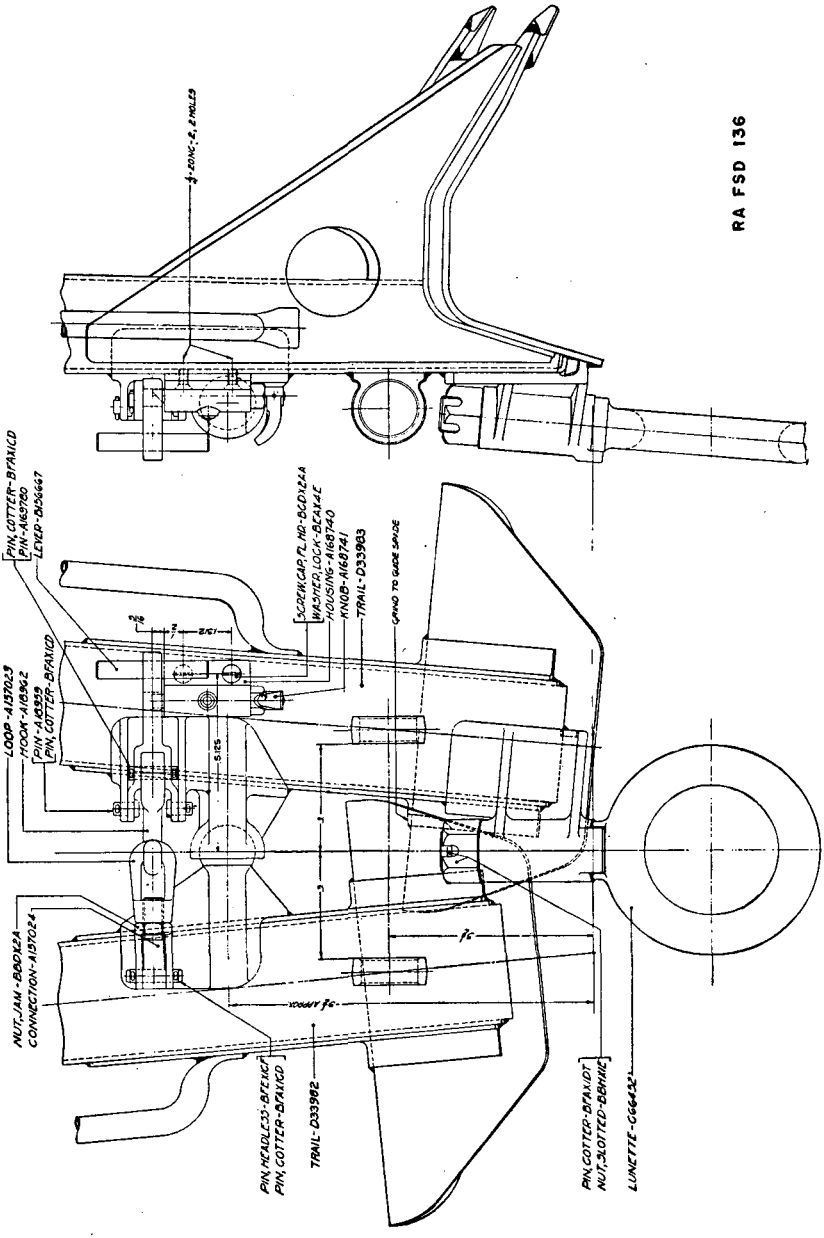

FIGURE 16.—37-mm gun carriage, M4—trail lock and lunette.

Reference	*Item*
A157024	Connection, trail lock.
A18962	Hook, trail lock.
A168740	Housing, trail latch.
A168741	Knob, trail lock lever latch.
B156667	Lever, trail lock (welded construction).
A157023	Loop, trail lock.
C66452	Lunette.
BBDX2A	Nut, jam, hex., s-fin., 9/16–18NF–2.
BBHX1E	Nut, slotted, s-fin., 1–14NF–2.
BFAX1CD	Pin, cotter, split, S., 3/32 by 5/8.
BFAX1DT	Pin, cotter, split., S., 1/8 by 2.
A169780	Pin, hdls., S., 3/8 diam. by 1.0 clear.
BFEX1CF	Pin, hdls., S., 3/8 diam. by 1.05 clear.
A18959	Pin, rod end, 3/8 by 9/16.
BCDX2AA	Screw, cap, fl-hd., 1/4–20NC–2 by 3/4.
D33982	Trail, left (welded construction).
D33983	Trail, right (welded construction).
BEAX4E	Washer, lock, shakeproof No. 15 type, 1/4-in.

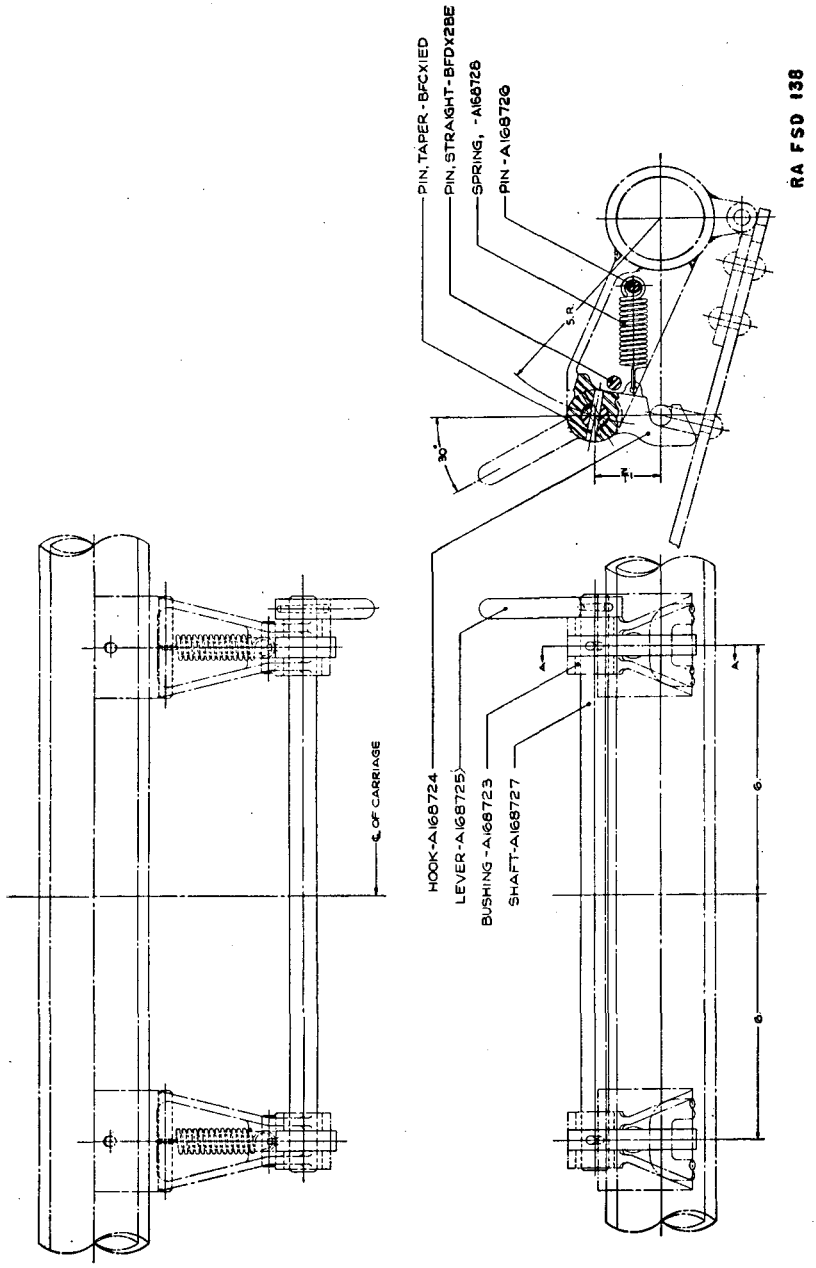

FIGURE 17.—37-mm gun carriage, M4—apron locking mechanism.

Reference	*Item*
A168723	Bushing, apron locking bracket.
A168724	Hook, apron locking.
A168725	Lever, apron locking mechanism.
A168726	Pin, apron locking hook spring.
BFDX2BE	Pin, straight, S., 5/16 by 1¼.
BFCX1ED	Pin, taper, No. 3 (0.219) by 1¼.
A168727	Shaft, apron locking mechanism.
A168728	Spring, apron locking hook.

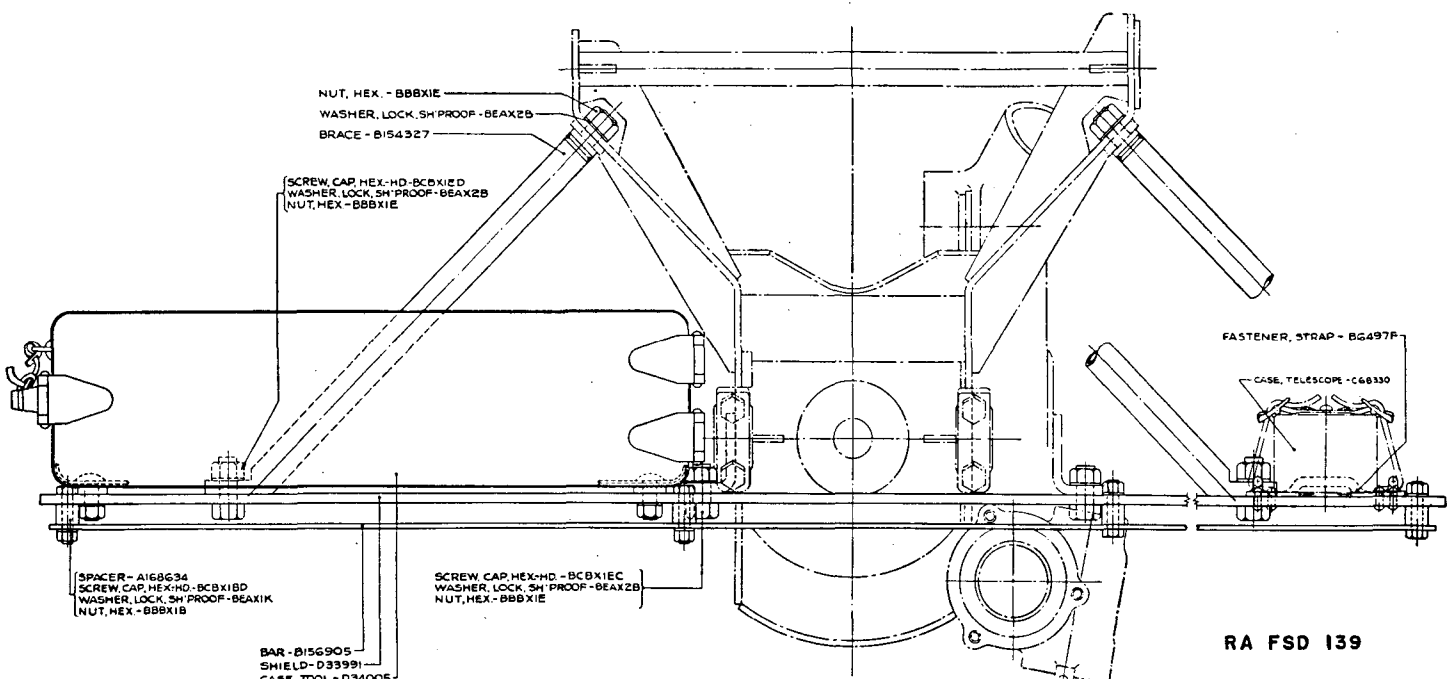
NUT, HEX. - BBBX1E
WASHER, LOCK, SH'PROOF - BEAX2B
BRACE - B154327
SCREW, CAP, HEX-HD-BCBX1E D
WASHER, LOCK, SH'PROOF - BEAX2B
NUT, HEX - BBBX1E
FASTENER, STRAP - BG497F
CASE, TELESCOPE - CG8330
SPACER - A168G34
SCREW, CAP, HEX-HD - BCBX1BD
WASHER, LOCK, SH'PROOF - BEAX1K
NUT, HEX - BBBX1B
SCREW, CAP, HEX-HD. - BCBX1EC
WASHER, LOCK, SH'PROOF - BEAX2B
NUT, HEX - BBBX1E
BAR - B156905
SHIELD - D33991
CASE, TOOL - D34005
RA FSD 139

FIGURE 18.—37-mm gun carriage, M4—shield.

Reference	*Item*
B156905	Bar, camouflage.
B154327	Brace, shield (welded construction).
C68330	Case, telescope.
D34005	Case, tool, assembly.
B6497F	Fastener, strap, 1¼-in., foo man loop.
BBBX1B	Nut, reg., hex., s-fin., 5/16–24NF–2.
BBBX1E	Nut, reg., hex., s-fin., ½–20NF–2.
BCBX1BD	Screw, cap, hex-hd., 5/16–24NF–2 by 1¼.
BCBX1EC	Screw, cap, hex-hd., ½–20NF–2 by 1.
BCBX1ED	Screw, cap, hex-hd., ½–20NF–2 by 1¼.
D33991	Shield.
A168634	Spacer, camouflage bar.
BEAX1K	Washer, lock, shakeproof No. 12 type, 5/16-in.
BEAX2B	Washer, lock, shakeproof No. 12 type, ½-in.

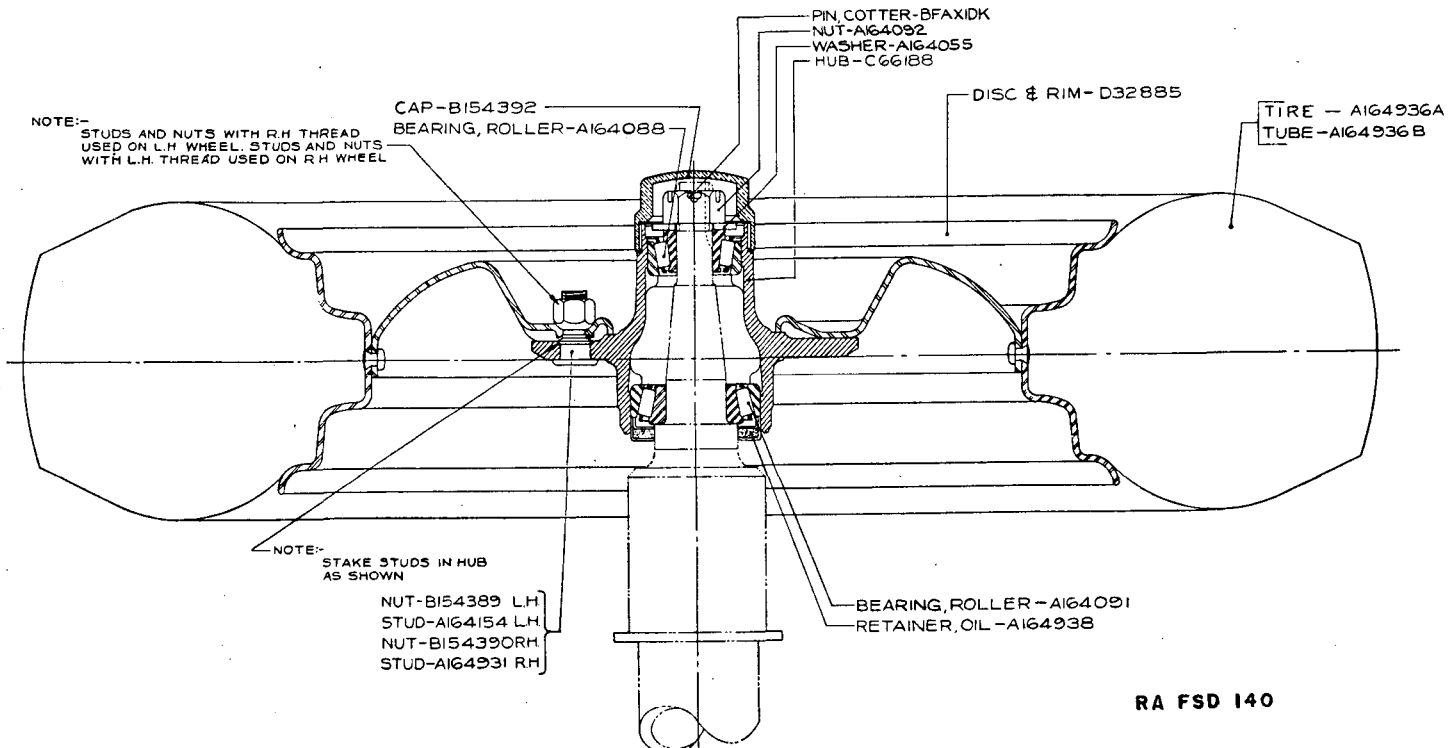

FIGURE 19.—37-mm gun carriage, M4-wheel.

Reference	*Item*
A164088	Bearing, roller, taper, group assembly.
A164091	Bearing, roller, taper, group assembly.
B154392	Cap, hub.
D32885	Disk and rim assembly.
C66188	Hub, wheel.
A164092	Nut, axle.
B154389	Nut, disk and rim stud, L. H. thread.
B154390	Nut, disk and rim stud, R. H. thread.
BFAX1DK	Pin, cotter, split, S., ⅛ by 1½.
A164938	Retainer, oil, 1.75 I. D. by 2.719 O. D. by ½ wide.
A164154	Stud, disk and rim, L. H. thread.
A164931	Stud, disk and rim, R. H. thread.
A164936A	Tire, hv-duty., balloon, 6-ply, 6 by 16.
A164936B	Tube, inner, automobile, low pressure balloon, 6 by 16, with Schrader rubber valve.
A164055	Washer, outer wheel bearing.

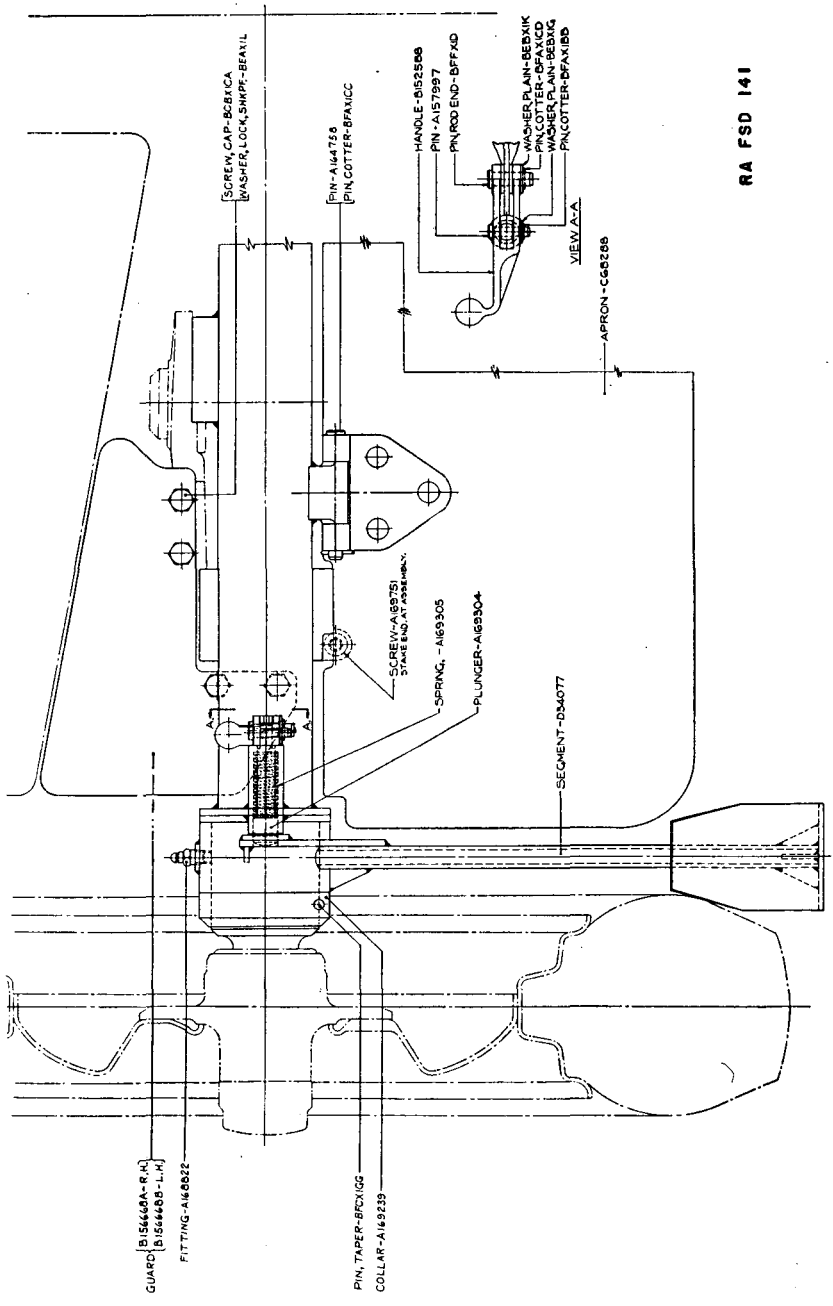

FIGURE 20.—37-mm gun carriage, M4—wheel segment and apron.

Reference	*Item*
C68288	Apron assembly.
A169239	Collar, axle.
A168822	Fitting.
B156668B	Guard, L. H.
B156668A	Guard, R. H.
B152588	Handle, segment locking plunger.
BFAX1BB	Pin, cotter, split, S., 1/16 by 7/16.
BFAX1CC	Pin, cotter, split, S., 3/32 by 1/2.
BFAX1CD	Pin, cotter, split, S., 3/32 by 5/8.
A157997	Pin, hinge.
A164758	Pin, hinge, apron.
BFFX1D	Pin, rod end, 3/8-in. diam.
BFCX1GG	Pin, taper, No. 5 (0.289) by 2.
A169304	Plunger, locking, segment.
BCBX1CA	Screw, cap, hex-hd., 3/8-24NF-2 by 3/4.
A169751	Screw, stop, support.
D34077	Segment (welded construction).
A169305	Spring, segment locking plunger.
BEAX1L	Washer, lock, shakeproof No. 12 type, 3/8-in.
BEBX1G	Washer, plain, S., 1/4-in.
BEBX1K	Washer, plain, S., 3/8-in.

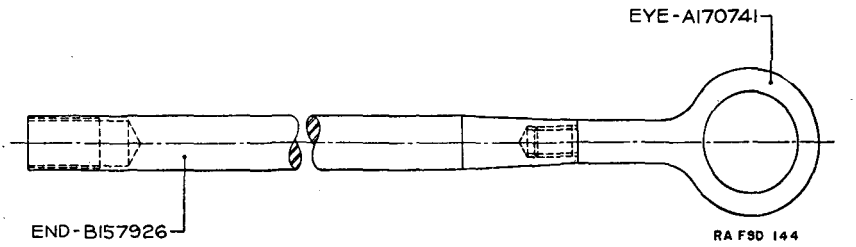

FIGURE 21.—Piston rod puller.

Reference	*Item*
B157926	End.
A170741	Eye.

APPENDIX

LIST OF REFERENCES

1. Basic field manual.

37-mm gun, antitank, M3 ..... FM 23–70.

2. Standard nomenclature lists.

Tools, special repair ..... SNL A–35.
Gun, 37-mm, M3, and carriage, gun, 37-mm, M4 ..... SNL A–44.
Material, cleaning and preserving, and tools and equipment used therewith ..... SNL K–1.

Current Standard Nomenclature Lists are as tabulated here. An up-to-date list of SNL's is maintained as the Ordnance Publications for Supply Index (OPSI).

3. Technical manuals.

Cleaning and preserving materials ..... TM 9–850 (now published as TR 1395–A).
Star gaging equipment and gutta-percha impressions ..... TM 9–1860 (now published as supplement to SNL N–9).
Pressure gage outfits for cannon ..... TM 9–1870 (now published as supplement to SNL N–9).

4. Ordnance field service bulletins.

Maintenance of Matériel in hands of troops ..... OFSB 4–1.
Electric and oxyacetylene welding ..... OFSB 5–2.

5. Ordnance proof manual (proof of guns and carriages).

6. Artillery gun book ..... O. O. Form 5825
[A. G. 062.11 (10–28–40).]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

OFFICIAL:

E. S. ADAMS,
Major General,
The Adjutant General.

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